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ABSTRACT

In fall 1989, the initial implementation of the Asbestos Hazard Emergency Response Act of 1986 (AHERA) was evaluated. AHERA regulations required inspection of all elementary and secondary schools to identify any asbestos-containing building materials present; preparation of an asbestos management plan for each school; notification of parents and staff of the plan's availability for review; and training of school maintenance and custodial workers. The evaluation study focused on buildings occupied by K-12 students and employed a national statistical sample of 30 communities, in which 198 schools were visited and thoroughly inspected. Findings were compared with the original AHERA inspection as presented in each schools' management plan. The evaluation comprised six separate research areas: school building inspections; management plans; response actions; original AHERA inspection evaluation; notification; and maintenance and custodial worker training. Original AHERA inspectors had correctly estimated the quantity of each asbestos-containing material in 60 percent of the buildings. The report contains a glossary, an executive summary, and numerous graphs, figures, and tables. An appendix volume contains sample AHERA evaluation data collection forms, discussion guides and findings for staff and parent notification groups, management plan results, an EPA key elements checklist, sample correspondence, and information about statistical and technical methods. (MLH)

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TABLE OF CONTENTS

Chapter   Page

GLOSSARY xiii

EXECUTIVE SUMMARY xxiii

1 INTRODUCTION 1-1

- 1.1 Background 1-1
- 1.2 Description of AHERA 1-2
- 1.3 Study Tasks 1-5
- 1.4 Research Areas and Design 1-6
- 1.5 Final Report 1-11

2 METHODOLOGY OVERVIEW 2-1

- 2.1 Sampling Methodology for the AHERA Building Sample 2-1
- 2.2 Building Inspection Protocols 2-2
  - 2.2.1 Definition of a Building 2-2
  - 2.2.2 Materials Included 2-3
  - 2.2.3 Excluded Materials and Areas 2-3
  - 2.2.4 Bulk Sampling 2-7
  - 2.2.5 Field Procedures 2-7
- 2.3 Pretest of Data Collection Procedures and Forms 2-9
- 2.4 Contacting the Local Education Agencies and Schools 2-10
  - 2.4.1 School Eligibility and Sample Selection - Task 1 2-10
  - 2.4.2 Scheduling Interviews and Inspections 2-11
- 2.5 Field Data Collection 2-13
  - 2.5.1 AHERA Designated Person Interviews - Task 2 2-13
  - 2.5.2 Reinspection of Schools - Task 3 2-16
  - 2.5.3 Principal Interview - Task 4 2-22
- 2.6 Management Plan Evaluation 2-22
  - 2.6.1 Management Plan Evaluation - Task 5 2-22
  - 2.6.2 Original AHERA Inspector's Performance Score 2-25

TABLE OF CONTENTS (cont'd.)

Chapter Page

2.7 Telephone Interviews 2-25

2.7.1 Parent and Teacher Notification Survey- Task 6 2-25
2.7.2 Original Inspector Survey - Task 7 2-26

2.8 Focus Groups 2-27

2.8.1 Parent and Teacher Notification Focus Groups - Task 8 2-27
2.8.2 Maintenance and Custodial Worker Focus Groups - Task 9 2-28

2.9 Description of the Sample 2-29

3 SCHOOL BUILDING REINSPECTION 3-1

3.1 Suspect Material Found in the Original AHERA Inspections 3-4

3.1.1 Identification of Materials 3-7
3.1.2 Estimation of Material Quantities 3-14
3.1.3 Recording Material Locations 3-17

3.2 Assessment of ACBM Found at Original AHERA Inspection 3-24
3.3 Summary 3-26

4 MANAGEMENT PLAN EVALUATION 4-1

4.1 Completeness of Management Plans 4-1
4.2 Usability of Management Plans 4-10
4.3 Summary 4-17

5 RESPONSE ACTION EVALUATION 5-1

5.1 Response Actions Recommended in Management Plans 5-1
5.2 Appropriateness of Response Actions Recommended 5-3
5.3 Evaluation of Response Actions Actually Performed in Schools 5-8
5.4 Summary 5-11

TABLE OF CONTENTS (cont'd.)

Chapter Page

6 ORIGINAL AHERA INSPECTION EVALUATION 6-1

6.1 Scoring the Original AHERA Inspection 6-2

6.1.1 Scoring Individual Materials 6-2
6.1.2 School Inspection Score 6-10

6.2 Analysis of Original AHERA Inspector's Background 6-15
6.3 Summary 6-19

7 PROCESS OF NOTIFICATION 7-1

7.1 Persons Notified 7-2
7.2 Method of Notification 7-4
7.3 Response to Notification 7-8
7.4 Alternative Notification Contents 7-13
7.5 Summary 7-14

8 MAINTENANCE AND CUSTODIAL WORKER TRAINING AND EXPERIENCE 8-1

8.1 Training of Maintenance and Custodial Workers 8-2
8.2 Curriculum of Training 8-9
8.3 Tasks Required of Maintenance and Custodial Workers 8-14
8.4 Summary 8-18

9 ADDITIONAL RESEARCH FINDINGS 9-1

9.1 Possible Compliance with AHERA 9-1
9.2 Clearance Air Monitoring Tests Performed 9-4
9.3 Current Assessment of Suspect Material in Schools 9-5

10 STATISTICAL PROPERTIES OF THE SAMPLE 10-1

10.1 Response Rates for the AHERA Evaluation 10-1

10.1.1 Building Access Results 10-1
10.1.2 Potential for Bias 10-3

6

TABLE OF CONTENTS (cont'd.)

Chapter | Page

10.2 Methodology for Weighting, Imputation, and Variance Estimation 10-8

10.2.1 Weighting Methodology for the AHERA Evaluation 10-8
10.2.2 Imputation for the AHERA Evaluation 10-8
10.2.3 Variance Estimation and Confidence Intervals 10-9

Appendices

Appendix

A AHERA Evaluation Data Collection Forms A-1

B Parent and Teacher Notification Focus Groups - Discussion Guide and Findings B-1

C Maintenance and Custodial Worker Focus Groups - Discussion Guide and Findings C-1

D Management Plan Completeness Item Results D-1

E EPA Key Elements Checklist E-1

F Local Education Agency and School Contact Letters F-1

G Statistical Technical Appendix G-1

H Assessment Score Tables H-1

List of Tables

Table

2-1 Field effort by wave 2-13

2-2 The percentage of schools nationwide by eligibility status 2-30

3-1 Estimated number and percent of suspect materials identified in original AHERA inspections, by material category and friability 3-8

TABLE OF CONTENTS (cont'd.)

List of Tables (cont'd.)

Table		Page
3-2	Estimated quantity present and percentage identified in original AHERA inspections of suspect materials, by material type and friability	3-10
3-3	Percentage of material quantities underestimated in original AHERA inspection, by material category, asbestos content, and friability	3-15
3-4	Estimated percent of areas with suspect materials present, but not recorded in original AHERA inspection, by area type and material type	3-19
3-5	Estimated percent of areas with ACBM present, but not recorded in original AHERA inspection, by area type and material type	3-20
3-6	Percent of ACBM in school buildings assessed appropriately in the original AHERA inspection	3-25
3-7	Percent of ACBM in school buildings assessed appropriately in accordance with AHERA in the original AHERA inspection	3-26
4-1	Percent of Management Plans awarded various normalized scores for completeness points for Form M1	4-4
4-2	Percent of Management Plans containing various features that increase usability	4-11
4-3	Percent of Management Plans containing various usability elements	4-12
4-4	Percent of Management Plans which included features that decrease usability	4-13
4-5	Percent of Management Plans using AHERA-defined terms correctly	4-13
4-6	Percent of schools which defined Management Plan terms correctly	4-14
4-7	Percent of Management Plans usable and understandable without instruction, by persons of various educational attainments	4-15

TABLE OF CONTENTS (cont'd.)

List of Tables (cont'd.)

Table		Page
4-8	Percent of Management Plans judged easily usable without prior instruction, by different types of persons	4-16
5-1	Estimated numbers and percentages of recommended response actions, by asbestos material category	5-2
5-2	Estimated numbers and percentages of school buildings with different recommended response actions, by asbestos material category	5-3
5-3	Characteristics of recommended response actions, by asbestos material category	5-6
5-4	Adequacy of remediation performed, by asbestos material category and remediation category	5-10
5-5	Differences in adequacy of remediation performed in school buildings, by response action category	5-12
5-6	Differences in adequacy of remediation performed in school buildings, by asbestos material category	5-13
6-1	AHERA Inspection Evaluation: Material Scoring Plan	6-6
6-2	Inspection quality by scoring factor	6-7
6-3	Comparison of different material weightings for computing school inspection scores	6-11
6-4	Estimated percent of inspections in each range	6-13
6-5	Association between number of suspect materials in a school and the school inspection score	6-14
6-6	Association between number of missed materials in a school and the school inspection score	6-16
6-7	Selected characteristics of original AHERA inspectors at the time of the original AHERA school inspection	6-17
6-8	Median school inspection scores by selected characteristics of the original AHERA inspector	6-18
6-9	Pearson correlation coefficients between school inspection scores and selected original AHERA inspector attribute level	6-19

TABLE OF CONTENTS (cont'd.)

List of Tables (cont'd.)

Table		Page
7-1	Percent of schools notifying parents and teachers about activities pertaining to asbestos since December 1987	7-3
7-2	Percent of schools notifying parents and teachers once and more than once	7-4
7-3	Percent of schools using specific methods to notify parents and teachers	7-5
7-4	Percent of schools with various contents in notification as reported by principals, parents, and teachers	7-7
7-5	Percent of schools with notifications where parents and teachers reacted to notification, as reported by principals, parents, and teachers	7-9
7-6	Percent of schools where parents and teachers took specific actions in response to notification	7-10
7-7	Percent of schools where various degrees of concern were expressed by parents and teachers as reported by principals, parents, and teachers	7-11
8-1	Percent of schools providing maintenance and custodial worker training since October 1987	8-3
8-2	Percent of schools providing training to maintenance and custodial workers since October 1987	8-5
8-3	Percent of schools providing various lengths of maintenance and custodial worker training since October 1987	8-6
8-4	Percent of schools with different training intervals for maintenance workers and custodians	8-7
8-5	Percent of schools with different provisions for training newly-hired maintenance workers and custodians	8-8
8-6	Percent of schools where the location of training sessions for LEA-employed maintenance and custodial workers was on site, off site, or both	8-10

TABLE OF CONTENTS (cont'd.)

List of Tables (cont'd.)

Table		Page
8-7	Percent of schools where training provided to LEA-employed maintenance workers and custodians contained a description of where asbestos-containing building materials were found in the school	8-11
8-8	Percent of schools where training provided to LEA-employed maintenance workers and custodians included a description of the location of asbestos, by method of presentation	8-12
8-9	Percent of schools where training presented information on locations of asbestos-containing building materials	8-13
9-1	Estimated national percent of schools with selected responses to screening interview	9-2
9-2	Estimates of noncompliance with the Management Plan and inspection portions of AHERA under various assumptions	9-4
9-3	Percent of Management Plans that contained air sampling results that used Transmission Electron Microscopy (TEM) and Phase Contrast Microscopy (PCM) for their tests	9-5
9-4	Amount of ACBM material in each AHERA category at time ofreinspection, by material type and unit of measurement	9-8
9-5	Percent of ACBM material in each AHERA category at time of reinspection, by material type and unit of measurement	9-9
10-1	Participation status of schools in the sample	10-1
10-2	Final completion status for schools in Research Area 4 and Research Area 5	10-2
10-3	Response rates for AHERA (%)	10-3
10-4	The schools in the AHERA evaluation by certain demographic variables at various stages of sampling	10-4
10-5	The schools in the primary sample by response status and selected demographic variables	10-7

11

TABLE OF CONTENTS (cont'd.)

List of Exhibits

Exhibit — Page

2-1 Material types included in the AHERA evaluation 2-4

2-2 Material types excluded from the AHERA evaluation 2-5

2-3 Area classification for the AHERA evaluation 2-6

2-4 Flow chart of field procedures 2-8

List of Figures

Figures — Page

3-1 Universe of suspect materials in school buildings 3-6

3-2 Quantity of suspect material identified in original AHERA inspection, by material category and friability 3-11

3-3 Incidence of buildings with suspect materials identified and unidentified in original AHERA inspection, by material type 3-13

3-4 Percent of buildings with suspect material quantity properly estimated in original AHERA inspection, by material category, asbestos content, and friability 3-18

3-5 Percent of buildings with areas containing suspect materials present, but not recorded in original AHERA inspection, by material category, asbestos content, and area use 3-23

4-1 Normalized overall completeness scores for Management Plans 4-5

5-1 Estimated number of recommended response actions by school building, among buildings with ACBM 5-5

5-2 Differences in characteristics of recommended response actions within school buildings (percent of buildings with indicated characteristics) 5-7

6-1 Estimated national distribution of inspection scores on individual materials 6-8

6-2 Mean inspection score, by material type 6-9

TABLE OF CONTENTS (cont'd.)

List of Figures (cont'd.)

Figures Page

6-3 Estimated national distribution of school inspection scores 6-12

GLOSSARY

ACBM	Asbestos-containing building material means surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a building.
ACM	Asbestos-containing material means, when referring to school buildings, any material which contains more than one percent asbestos.
ACM Condition	**Good:** ACM with no visible damage or deterioration, or showing only very limited damage or deterioration. **Damaged:** ACM showing physical injury or deterioration such that the internal structure of the material is inadequate, or which has delaminated such that its bond to the substrate is inadequate, or which lacks fiber cohesion or adhesion properties for any other reason. Also, Thermal System Insulation (TSI) is considered damaged when it is lacking part or all of its covering. Such damage may be illustrated by the separation of ACM into layers; flaking, blistering, or crumbling; water damage or stains; scrapes, mars or gouges; exposed TSI beneath its covering. **Significantly Damaged:** ACM showing damage which is extensive and severe.
ADP	AHERA designated person.
AHERA	Asbestos Hazard Emergency Response Act. This Act was signed into law on October 22, 1986 by President Reagan. It requires, among other things, that primary and secondary schools identify asbestos-containing materials in school buildings and institute programs aimed at minimizing the risk of asbestos exposure in those buildings.
AHERA Designated Person (ADP)	A person designated by the Local Education Agency to ensure that the AHERA requirements are properly implemented.

Area	A well-defined space within a building, generally a distinct room, but may be a hall, crawlspace, or other distinct space. This definition was used by the AHERA evaluation, not by AHERA.
Asbestos	Naturally-occurring fibrous mineral used in many building materials, primarily for the purposes of fireproofing, thermal insulation, sound insulation and decoration.
Assessment	Evaluation of the physical condition and potential for damage of all friable ACM and thermal system ACM. AHERA requires classification of each ACBM assessed into one of seven categories based on material type and damage/potential for damage.
Building	A separate structure. Two structures sharing an interior wall are considered one building, even though they may have been constructed at different times. Two structures connected only by an above-ground (covered or uncovered) or underground walkway are considered two buildings.
Bulk Sample	A small portion (usually about thumbnail size) of a suspect asbestos-containing building material collected by the asbestos inspector for laboratory analysis to determine asbestos content.
Custodian	A person who is responsible for performing day-to-day routine care of the building, including such tasks as cleaning of floors and bathrooms, locking doors and general security, reporting items in need of repair, emptying garbage. In some schools, the custodian is responsible for repairs as well as general care, i.e., there are no individuals referred to as maintenance workers in those schools. Schools may employ custodial staff or may hire a vendor to perform custodial services.

Eligibility Criteria	Factors used to determine whether to include a school/building in the study. Specifically, school criteria are: if classes in any of grades 1-12 were taught during the 1989-90 school year and if the school had a Management Plan. Building criteria are: if the building was built before October 1988 and had been inspected for ACM since December 1987, if the inspection discovered ACM or suspect ACM, and if students in any of grades 1-12 were regularly in the building during the 1989-90 school year.
Encapsulation	The treatment of asbestos-containing material (ACM) with a liquid that covers the surface with a protective coating or embeds fibers in an adhesive matrix to prevent the release of asbestos fibers.
Enclosure	An airtight, impermeable, permanent barrier around asbestos-containing material to prevent the release of fibers.
EPA	U.S. Environmental Protection Agency.
Exclusion	One of several situations which permit a LEA to delete one or more of the items required by AHERA, e.g. records of previous sample collection and analysis may be used by the accredited inspector in lieu of AHERA bulk sampling.
Exterior Areas	Subdivison of areas of a building with one or more walls open to the outside, such as covered walkways or porticos.
Forms	**A1** - AHERA Designated Person Interview - In-person questionnaire administered to the ADP to collect information on building eligibility, Management Plans, and maintenance and custodial training. **A2** - Building Information Questionnaire - In-person questionnaire completed by the interviewer after Form A1 to obtain information about the selected building's construction and asbestos history. **W1** - Remediation Assessment - In-person data collection form used to record remediations as reported by the ADP, subsequently completed during the reinspection. **W2** - Area Identification - Data collection form used to identify and categorize each area inspected and to record number of suspect homogeneous materials.

Forms (cont'd.)	**W3** - Suspect Homogeneous Materials - Data collection form used to record all suspect homogeneous materials in an area, the quantity of each material, and the assessment factors used to calculate the AHERA 1-7 category for each material. **I1** - Suspect Homogeneous Materials Key Code - Three forms, one each for TSI, surfacing, and miscellaneous material, used to generate a unique identification number for each suspect homogeneous material found in a building. **I2** - Suspect Homogeneous Materials Calculations - Calculation space for inspectors to determine the quantity of a homogeneous material in one area. **P1** - Principal Interview - In-person questionnaire administered to the school principal to collect information on notifications. **N1** - Parent and Teacher Notification Interview - Telephone questionnaire administered to one parent and one teacher from each school in the study sample, to collect notification information. **O1** - Original Inspectors Interview - Telephone questionnaire administered to the inspectors who conducted the original AHERA inspection for the schools in the study sample. **M1** - Management Plan Checklist - Checklist completed by Management Plan reviewer to obtain information on the Plan's completeness, usability, and content and thus present a structure for grading the Plan. **M2** - Management Plan Comparison Report - computer-generated form that presents findings of the Westat reinspection with space for the Management Plan reviewer to fill in findings of the original AHERA inspection for each material found by Westat.
Friable	Material that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Functional Space	Under AHERA, a room, group of rooms, or homogeneous area designated by a person accredited to prepare Management Plans, design abatement projects, or conduct response actions.
General Access Area	Subdivision of areas of a building which includes all areas accessible to school staff and students on a regular basis.
Homogeneous Area	In accordance with AHERA definitions, an area of surfacing material, TSI, or miscellaneous material that is uniform in color and texture.
Homogeneous Material	For this study, material that is uniform in color, texture and appearance, was installed at one time, and is of a distinct material type and use. The homogeneous material is analogous to AHERA's homogeneous area.
HVAC	Heating, Ventilating and Air Conditioning.
Identified Material	Any suspect material found during the study reinspection that was also recorded in the relevant Management Plan for a particular building.
LEA	Local Education Agency.
Limited Access Area	Subdivision of areas of a building which includes areas accessible to staff and teachers, but not students, on a regular basis.
Local Education Agency (LEA)	An educational agency at the local level that exists primarily to operate schools or to contract for educational services. This includes primary and secondary public and private schools.
Maintenance Worker	A person who is responsible for repairing, cleaning, or renovating machines or for repairing or renovating other building parts. Schools may employ persons as maintenance staff or may hire a vendor to perform maintenance work.

Management Plan	A document that each Local Education Agency is required to prepare under AHERA regulations. This document describes all activities planned and undertaken by a school to comply with AHERA regulations, including: building inspections to identify asbestos-containing materials, response actions, and operations and maintenance programs to minimize the risk of exposure to asbestos in school buildings.
Material Category	Broad classification of suspect materials into TSI, surfacing material, and miscellaneous material.
Material Type	Classification of suspect material by its specific use or application, e.g., pipe insulation, fireproofing and floor tile.
Mechanical Area	Subdivision of areas of a building which includes boiler rooms, pipe shafts, and telephone and electrical closets.
Miscellaneous Material	Interior building material on structural components, such as floor or ceiling tiles. Does not include TSI or surfacing material.
Operations and Maintenance Program (O&M)	Program of work practices to maintain friable ACBM in good condition, ensure cleanup of asbestos fibers previously released, and prevent future release by minimizing and controlling friable ACBM disturbance or damage.
Original AHERA Inspection/Original Inspection/Inspection	Examination of school buildings arranged by Local Education Agency, pursuant to AHERA, to identify asbestos-containing materials, evaluate the condition of those materials, and take samples of materials suspected to contain asbestos. Inspections are to be performed by inspectors accredited by the EPA.
OSHA	Occupational Safety and Health Administration.
Permanent Building	Any building with poured concrete, cinder block with mortar, or other non-temporary foundation.

Principal	A staff member performing the assigned activities of the administrative head of a school to whom has been delegated major responsibility for the coordination and direction of the activities of the school.
Private School	An elementary or secondary school (1) controlled by an individual or agency other than a State, a subdivision of a State (county, city, etc.), or the Federal government; (2) usually supported primarily by other than public funds; and (3) the operation of whose program rests with other than publicly elected or appointed officials.
PSU	Primary Sampling Unit, a geographic area, usually a county or group of counties, defined by the Census Department for survey sampling purposes.
Public School	A school administered by State and local governments, including counties and territories, and paid for with State and local funds.
Recorded Area	An area in which a suspect material is present during the study reinspection, and which is also indicated in the Management Plan as having the same material present.
Reinspection	The examination of homogeneous materials in which an original AHERA inspection has been performed previously. For this study, reinspections were performed without knowledge of the results of the original AHERA inspection.
Remediation	For the AHERA evaluation, repair, encapsulation, enclosure, or removal of greater than three linear feet or square feet of ACBM.
Removal	The taking out or stripping of ACBM from an area, a functional space, or a homogeneous area.
Repair	Procedures used to patch or cover damaged asbestos-containing materials other than enclosure or encapsulation. Examples include covering the damage with plastic sheeting, duct tape, or plaster.

Response Actions	Any of the following actions taken in school buildings in response to AHERA, to reduce the risk of exposure to asbestos in school buildings: removal, encapsulation, enclosure, repair, and Operations and Maintenance.
Secondary School	A school that meets the state's definition of a secondary school. A school that is intermediate in level between elementary school and college.
Superintendent of Schools	A staff member who is the Chief Executive Officer of a school administrative unit or Local Education Agency.
Surfacing Material	Material sprayed or troweled onto structural members (beams, columns or decking) for fire protection; or on ceilings or walls for fireproofing, acoustical or decorative purposes. Includes fireproofing, textured plaster, and other textured wall and ceiling surfaces.
Suspect Material	Building material suspected to contain asbestos because of past practices in its manufacture and use; includes surfacing material, floor tile, ceiling tile, thermal system insulation, and miscellaneous other materials. Suspect materials are classified as ACM or non-ACM by analyzing bulk samples to determine asbestos content.
Teachers' Union Representative	Individual who belongs to the National Education Association (NEA), American Federation of Teachers (AFT), or other union or association. The representative may be called "shop steward," "building representative," "union representative," "officer," or "association representative."
Temporary Building	A structure put in place for a specific, short-term purpose. The structure will be taken down when that purpose is completed.
Total Amount	Estimated amount (in square or linear feet) of suspect material in a building(s) at the time of the original AHERA inspection.
Transite	Commonly used trade name for cement asbestos product.

TSI	Thermal System Insulation; i.e., insulation applied to steam and hot and cold water systems and HVAC systems to prevent heat transfer and water condensation. Includes pipe insulation; pipe joint, valve, fitting and elbow insulation; and insulation applied to boilers, water tanks, compressors, air-handling equipment, radiators, ducts, etc.
Underestimated Amount	The difference between the quantity of a suspect material found during the study reinspection and the quantity of the same material recorded in the Management Plan, when the latter quantity is less than 80 percent of the former.
Unidentified Material	Any suspect material in the study that is not addressed in the relevant Management Plan for a particular building, but which was found during the study's reinspection of the building.
Usability	A measure of the ease with which a person could learn from the Management Plan which materials are asbestos, the condition of the asbestos materials, and what special precautions should be taken around those materials. Included in the measure are document formatting items such as glossaries and a table of contents, and clarifying items such as accurate use of terminology and floorplans.
VAT	Vinyl asbestos floor tile.
VDC	Vibration dampening cloth, usually found on ductwork where duct size changes, used to reduce noise.

EXECUTIVE SUMMARY

In Fall 1989, EPA's Office of Toxic Substances asked Westat to perform an evaluation of the implementation of the Asbestos Hazard Emergency Response Act (AHERA). The AHERA regulations called for the inspection of all elementary and secondary schools in the nation to identify any asbestos-containing building materials (ACBM) present, preparation of an asbestos Management Plan for each school, notification of parents and staff of the availability of the Management Plan for review, training of school maintenance and custodial workers, and other tasks.

The AHERA evaluation attempted to evaluate the implementation of AHERA. This evaluation did not attempt to study compliance with all elements of the AHERA legislation. First, schools that did not have a Management Plan were excluded, thus separating out this category of non-compliers. Second, certain activities required under AHERA were not evaluated. These included reviewing the "process" of carrying out response actions, such as verifying that appropriate containments were used when required and appraising Operations and Maintenance plans. Also, not all possible suspect items were included in the suspect materials category for this evaluation study. For example, wallboard, cement block, and flooring under wall-to-wall carpeting were beyond the scope of the study.

Although the idea of air monitoring of asbestos fibers was considered, it was rejected in favor of inspection and assessment of building materials that could potentially release asbestos fibers. This approach was used for two reasons. First, because the AHERA regulations specifically call for the inspection and assessment of building materials in schools, we wanted to determine how well this was done. In this sense, AHERA serves primarily as a preventive measure to ensure that existing asbestos in schools does not become friable or present a future exposure source. Second, it is often possible for air monitoring to show no asbestos fiber release, even though release can occur when asbestos-containing materials are disturbed (through contact, maintenance, renovation, etc.). Thus, air monitoring could miss the points in time when fibers are released. AHERA is concerned with preventing not only current asbestos fiber release, but **potential release** as well.

The AHERA evaluation study focused on occupied school buildings with students in any of grades 1 through 12 in the United States. There were a few exclusions: buildings built more recently than October 1988,[1] buildings where the original AHERA inspection found no asbestos, and buildings where no inspection was conducted in response to AHERA or where no Management Plan was prepared. We estimate that the schools included in the target population from which we sampled for this evaluation represent approximately 80 percent of all schools in the nation.

The AHERA evaluation was conducted in a national statistical sample of 30 communities, in which we visited 198 schools and a total of 207 school buildings. Participation in this evaluation was voluntary, and approximately 25 percent of the originally sampled schools elected not to participate. Specially selected and trained inspectors thoroughly reinspected each sampled school building, and their findings were compared with the original AHERA inspection at each school. In-person interviews were conducted with each school principal and AHERA designated person (ADP). In addition, telephone interviews were conducted with the inspector who had performed the original AHERA inspection, the head of the PTA (or other active parent), and an active teacher in the school.

In both the original AHERA inspections and our reinspections, the inspectors looked for suspect building materials. Suspect building materials are construction materials thought to contain asbestos because of past practices in their formulation and manufacture. Inspectors find and assess asbestos by locating and examining suspect building materials. Laboratory analysis of a bulk sample is required to determine if a particular suspect material in fact contains asbestos. Since AHERA required the identification of suspect material, bulk sampling was not needed as part of this evaluation. Instead, we focused on evaluating how well the original AHERA inspections identified, assessed, described, and quantified suspect materials.

To supplement the statistical data on the degree of success of the original AHERA inspections, a number of focus groups (i.e., guided group discussions for in-depth exploration of a topic) were undertaken in communities nationwide. Four focus groups were held with parents and teachers not associated with schools in our sample. In addition, five focus groups were held with school maintenance and custodial workers also not associated with our sampled schools. In both cases, participants in the focus groups were selected in a non-random, non-statistical manner. Rather, as is usually the case in a focus group, participants were invited purposefully to create a group with many different types of people. While this small sample of focus groups is not a reliable basis for statistical estimates (and has not been used in such a way), it did provide useful qualitative insights into the notification process and maintenance and custodial training and experience.

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[1] Any building built after this date was not required to be inspected under AHERA. These buildings must, however, have a signed statement by an architect engineer, or accredited inspector, stating that, to the best of his\her knowledge, no ACBM was specified or used in construction.

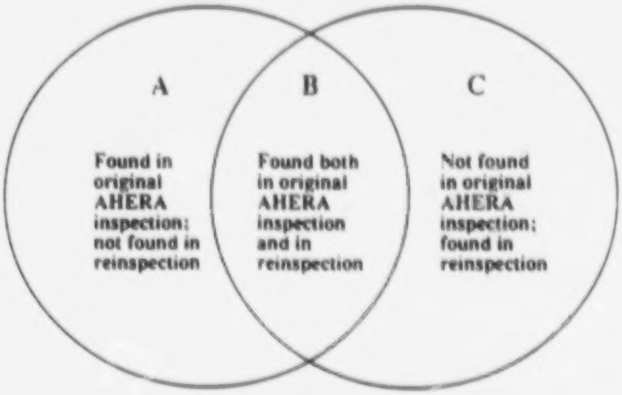
The AHERA evaluation research consisted of six separate Research Areas. Each Research Area addressed a different aspect of the AHERA program: school building inspections, Management Plans, response actions, original AHERA inspection evaluation, notification, and maintenance and custodial worker training. EPA, in consultation with Westat and the technical consultants who worked on this project, developed specific research questions for each Research Area. The goal of the evaluation research was then to collect and analyze data to answer the questions. A brief summary of the research questions and the study findings follows.

School Building Reinspection

- *Was all the suspect material found at the original AHERA inspection?*
- *Was the asbestos found at the original AHERA inspection properly assessed?*

The goal of this Research Area was to estimate how much of the suspect material was found in the original AHERA inspections and how much of the ACBM was assessed in conformance with AHERA regulations. "How much" was measured in three ways: (1) **how many** of the individual suspect materials in school buildings were identified; (2) **to what extent were quantities** of identified materials properly estimated; and (3) **what percentage of the areas** with each type of suspect material was recorded in the original inspection. Figure 1 illustrates the universe of suspect materials in school buildings.

Figure 1. **Universe of suspect materials in school buildings**[2]


A
B
C
Found in original AHERA inspection; not found in reinspection
Found both in original AHERA inspection and in reinspection
Not found in original AHERA inspection; found in reinspection

An estimated 70 percent of the **individual suspect materials** still present in school buildings at the time of reinspection were identified by the original AHERA inspection.[3] Many types of materials were identified in the vast majority of inspections. These included floor tile, ceiling tile, and all types of thermal system insulation. However, certain types of materials were regularly unidentified. These included vibration dampening cloth, fire doors, and linoleum.

The original AHERA inspection identified most of the **quantity of the suspect material**. While we could not confirm the quantity of material already removed, we were able to determine a lower bound on the percent of the quantity which the original AHERA inspections identified. Assuming that the amount is exactly that which Management Plans indicated was removed, the original AHERA inspections identified 89 percent of the total quantity of the suspect material. Again, this percentage varied by material type.

Our reinspections revealed that, once the original AHERA inspections had identified suspect material, the quantity of all suspect materials was estimated "properly"[4] in over 50 percent of buildings. The quantity of each ACBM was estimated properly in over 60 percent of buildings. The overall quantity of material estimated properly ranged from 91 percent (for TSI) to 45 percent (for friable miscellaneous materials). Also, original AHERA inspections recorded the specific locations of identified ACBM in approximately 60 percent of the areas where the material was present.

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[2] Diagram for illustration only. Ratios in actual data not shown.

[3] Material found by the original inspector but not found in the reinspection was assumed to have been removed. Material found in the reinspection but not in the original inspection was assumed to be unidentified by the original inspection rather than added after the inspection.

[4] Original quantities were considered "properly" estimated if they were no more than 20 percent below the reinspection quantity.

With regard to assessment of ACBM, the original AHERA inspections assessed almost all materials appropriately, that is, the condition or amount of damage was recorded. However, 44 percent of the original AHERA inspections specifically utilized the AHERA 1-7 assessment categories. Those who did use the AHERA 1-7 categories generally applied them appropriately, which is to say the correct 1-7 category was assigned based on material category, condition, friability, and potential for damage.

Management Plan Evaluation

- *Do schools know and understand the regulation, as shown by the completeness of the Management Plan?*

The objective of this Research Area was to evaluate Management Plans for completeness and usability. **Completeness** for this study was based primarily on the EPA's Key Elements Checklist. Management Plans were generally complete, with 80 percent (± 6%) of the Plans receiving a score of 75 points or higher on a completeness scale of 1-100. However, 5 percent (± 4%) of Management Plans received a score of 64 or below, making it clear that a few Plans, even with Federal and State guidelines, were substantially incomplete.

The second criterion, **usability**, was developed to determine how useful a Plan would be and whether it could easily be used as a reference. Under AHERA, the Plan is to be made available for public review and is to be available for use by custodial and maintenance workers. We looked at features which would facilitate use of a Management Plan, such as table of contents, page numbering, and floorplans showing sampling locations, homogeneous areas, or ACBM. Many Plans missed one or more of these elements. We also evaluated various features which decrease usability, such as computerized data not explained or problems with the presentation of homogeneous area information. Sixty-nine percent of Plans had one or more features that detracted from ease of use.

AHERA defines four highly significant terms for use in inspections and reporting. These terms are homogeneous area, functional space, exclusion, and random sampling. Only 37 percent (± 9%) of Management Plans used all four terms correctly, while 46 percent (± 12%) of the plans used exactly three terms correctly.

Finally, we attempted to determine the percentage of Plans usable and understandable by persons of various educational attainment. We found that 39 percent (± 5%) of Plans were written for persons with some college coursework, and that an additional 22 percent (± 6%) could be used only by people who had instructions in use, regardless of level of education.

Response Action Evaluation

- *What response actions were recommended in the Management Plan?*
- *Are they appropriate, given the assessed condition of the asbestos?*
- *Have the remediations undertaken in the school been done properly?*

This Research Area used our evaluation results to estimate **response actions recommended** in the Management Plans for schools with ACBM. We estimate that 302,001 response actions were recommended in the Management Plans for 126,282 of the 179,093 schools with ACBM. Response actions include enclosure, encapsulation, removal, repair, and Operations and Maintenance programs. Over half of the recommended response actions were for the establishment of Operations and Maintenance programs. Another third specified the repair of damaged areas. Ten percent of the recommendations were for removal of some or all of the ACBM. Actions recommended in the Management Plans are for implementation over the life of the building.

Nearly all recommended response actions were appropriate, given the reported condition of the material. However, 80 percent were generic recommendations -- that is, they failed to specify the locations where the response action should be performed.

Remediations that had occurred in schools were visually evaluated to determine their adequacy. Remediations studied include enclosure, encapsulation, removal, and repair, and do not include Operations and Maintenance activities. The definition of "adequacy" varied with the type of remediation. For example, an enclosure was considered adequate if it appeared to be airtight and impact resistant. Removals were considered adequate if there was no visual evidence of remaining material.

An estimated 246,260 **remediations** have been performed in an estimated 36,390 school buildings, through Spring 1990. This represents 20 percent of school buildings with ACBM. Ninety-two percent of the remediations were visually judged to be adequate. Most encapsulations, repairs, and removals were considered adequate. However, only 12 percent of the 4,376 performed enclosures were adequate. Removals were performed in 28,626 buildings, representing 16 percent of the school buildings with ACBM.

Original AHERA Inspection Evaluation

- *Given the quality of the original AHERA inspection, as shown by a comparison between the reinspection findings and the findings presented in the Management Plan, what is the importance of the original AHERA inspector's training, experience, and background in inspection quality?*

This Research Area studied school inspections through a scoring system developed by the research team, in consultation with the technical consultants. The system evaluated the original AHERA inspector's ability to perform six components of an inspection. In descending order of importance -- in the research team's judgment -- the six components are: identification of a suspect material, appropriate assessment of the suspect material, recording the areas where it was located in the school, quantification within acceptable standards of accuracy, collection of the correct number of bulk samples, and use of the AHERA 1-7 categories for damage assessment. Each suspect **material** in a school building was scored on a scale from 0 to 40 according to the original AHERA inspector's performance on the six components. A score of 40 was assigned if the original AHERA inspector satisfied all six criteria for a material; a score of 0 was assigned if the original AHERA inspector failed to identify the material. Material scores were averaged to obtain a **school average inspection score**. The school average scores were grouped into ranges that characterized the original

AHERA inspector's performance. The ranges, descriptions, and the percentage of inspections in each range are as follows:

Range: 37-40. *"Thorough inspection"*. 16 percent of inspections.
On average, satisfied the 4 most important components, but may have failed on one or both of the other 2 components.

Range: 29-36. *"Some deficiencies"*. 46 percent of inspections.
On average, satisfied the 2 most important factors, but failed either to accurately quantify the material or to adequately locate it.

Range: 24-28. *"Deficient"*. 17 percent of inspections.
On average, satisfied the 2 most important factors, but neither accurately quantified the material nor adequately located it.

Range: 0-23. *"Serious deficiencies"*. 21 percent of inspections.
On average, failed to identify the material or assess it appropriately. May have also failed to adequately quantify or locate the material.

The primary causes of deficient inspections were failure to identify all suspect material in a school, to record the locations of the ACBM, or to quantify it within acceptable standards of accuracy.

Telephone interviews were conducted with the original AHERA inspectors to gather information about their education, experience, and background. Statistical analyses of the relationship between the inspection scores and the inspectors' backgrounds were conducted. We found no statistically significant associations between any measured characteristic (e.g., education) of the inspectors and the inspection scores. We suspect that this negative finding occurred because all of our information on the original AHERA inspections was obtained from reviews of the Management Plans. Many inspection companies use standard inspection forms and pre-programmed Management Plan outlines and shells. These standard forms and the outlines tend to cancel out much of the variation among individual inspectors which, in turn, negates the effects of their backgrounds.

Process of Notification

- *Who has been notified?*
- *Were these people notified through a letter, meeting, article in a school newspaper, or in another way?*
- *After notification occurred, did parents review the Management Plan, attend meetings to discuss asbestos in the school, or respond to notification with any other action?*
- *What might parent and staff reactions be to differently worded notification letters?*

The goal of this Research Area was to study parent and teacher reactions to notification. Through the use of interviews and focus groups with principals, active parents, and active teachers, the topic of notification was studied with consistent results. In general, while principals recalled notifying parents about the presence of a Management Plan, very often neither parents nor teachers recalled either being notified or the contents of the notification. Letters were the most common notification method. In the focus groups, we learned that both parents and teachers believe this is the most effective method of notification, particularly if the letters are sent by mail rather than hand-delivered to parents by students.

Both the survey and the focus groups showed that **parent reactions to notification** tended to be slight. According to the survey, parents in less than 20 percent of schools reacted to notification in any way. In the focus groups, almost no one recalled reacting to notification, and only a handful of participants predicted that they would react to any of the model notifications presented to them. Among those who did react, or predicted that they would react, both in the survey and focus groups, the range of actions was very small. They included only such activities as reviewing the Management Plan, calling the ADP for additional information or, at the most severe, requesting that a discussion of asbestos be added to a meeting agenda.

Through the use of focus groups, we also explored preferences for types of notification. Both parents and teachers were eager for a much more thorough level of notification than they have experienced to date. Specifically, they wanted a school-based notification mailed to each parent. They wanted this letter to contain the name and telephone number of the ADP (or other school representative such as the principal), a description of any planned response actions and the associated timetable, and brief but informative health risk information.

Maintenance and Custodial Worker Training and Experience

- *Are maintenance and custodial workers trained to work with and around asbestos?*
- *What topics were included in this training?*
- *What tasks relative to asbestos or suspect ACBM are regularly required of maintenance and custodial workers, and do these tasks correspond to the level of training received?*

This Research Area responded to questions involving maintenance and custodial worker training and responsibilities as a result of AHERA. ADPs were interviewed regarding the training of workers in their schools, and focus groups with maintenance worker and custodial workers were conducted at sites nationally.

In general, ADPs reported that the **length of training** received by workers who work with ACBM is frequently shorter than that required by AHERA. In particular, they reported that 87 percent (± 9%) of maintenance workers and 95 percent (± 6%) of custodians were trained by schools. They also reported that 74 percent (± 5%) of maintenance workers trained received less than the 16 hours called for by AHERA for workers who work with or disturb ACBM. By contrast, only 5 percent (± 6%) of custodians were trained for less than the two hours required by AHERA for basic awareness. For custodians (some of whom work around or disturb ACBM), 83 percent (± 8%) received less than 16 hours of training.

The ADPs' perspective on training was more favorable than what we found in our discussions with maintenance workers and custodians in focus groups. In general, ADPs presented a picture of training promptly given, though frequently shorter than AHERA stipulates for staff who work directly with asbestos. They also presented a picture of training that included extensive and often multiple presentations of the locations of ACBM.

By contrast, several participants in the focus groups did not remember being trained or, if they did, felt that it was no more than "*showing a video*." Many of the untrained workers, as well as some of the trained workers, also expressed concern about not knowing where ACBM was located in their schools or how to handle it properly.

The final questions in this Research Area related to tasks around ACBM for which maintenance workers and custodians are responsible. The focus group showed that frequent, unprotected, and inappropriate work practices were used by both maintenance workers and custodians in schools in the five communities in which focus groups were held. On the whole, these inappropriate work practices were performed to clean up fiber release episodes of less than 3 linear or square feet, or as routine maintenance/custodial activities. Because the workers were unsure if material contained asbestos, because of inadequate training or no training, or because of pressure to act immediately in a maintenance "emergency" situation (such as a pipe leak), exposure to asbestos may be occurring and appropriate procedures are being followed in only a few cases. Most workers did not express concern that they might be disturbing asbestos and creating a health hazard when they removed suspended ceiling tiles or brushed against insulated pipes. ACBM was seen as being disturbed only when it was sawed, cut, or in some other way visibly damaged.

All custodians in the focus groups reported that respirators were unavailable to them, while maintenance workers often reported that respirators were available only on a shared basis. Even when available, respirators were rarely used.

The findings of this evaluation, along with the results of other studies currently in progress, will be used to inform policy recommendations on asbestos-in-schools and any other programs which might be developed with regard to asbestos in public and commercial buildings.

1. INTRODUCTION

1.1 Background

In February 1988, the U.S. Environmental Protection Agency (EPA) published Asbestos-Containing Materials in Public Buildings, A Report to Congress. As a result of this report and the issues it raised, the EPA promised Congress to perform an evaluation of the effectiveness of the Asbestos Hazard Emergency Response Act (AHERA), that is, the reduction of potential for exposure to asbestos by the implementation of several of AHERA's important elements. The EPA also promised to report on its findings by Spring 1991.

The Asbestos Hazard Emergency Response Act (AHERA) was signed into law on October 22, 1986. AHERA required the EPA to establish a comprehensive regulatory structure for inspection, management planning, Operations and Maintenance activities, and appropriate abatement responses to control asbestos-containing materials in schools. The AHERA Asbestos-Containing Materials in Schools Rule requires Local Education Agencies (LEAs), such as school districts for public schools and dioceses for Catholic schools, to: (1) use specially-trained and certified asbestos inspectors to identify asbestos-containing materials; (2) develop asbestos Management Plans; (3) design and conduct major activities to control asbestos; and (4) make Management Plans available to all concerned persons and submit them to State governors.

The ultimate measure of AHERA's effectiveness is the degree to which it reduces exposure to asbestos and thus the incidence of asbestos-related diseases in school populations. However, the use of this measure implies the need for a long-term epidemiological study. Instead, the EPA determined that this evaluation would focus on the degree to which most of the key aspects of AHERA were properly implemented and the key factors which affected implementation.

This evaluation did not attempt to study compliance with all elements of the AHERA legislation. First, schools that did not have a Management Plan were excluded, thus separating out this category of non-compliers. Second, certain activities required under AHERA were not evaluated. These included reviewing the "process" of carrying out response actions, such as verifying that appropriate containments were used when required and appraising Operations and

Maintenance plans. Also, not all possible suspect items were included in the suspect materials category for this evaluation study. For example, wallboard, cement block, and flooring under wall-to-wall carpeting were beyond the scope of the study.

The Economics and Technology Division (ETD) of the EPA's Office of Toxic Substances (OTS) AHERA Evaluation workgroup provided project oversight. Westat, Inc. designed and conducted the project.

The research was divided into nine tasks: (1) School Screening and Sample Selection, (2) AHERA Designated Person (ADP) Interviews, (3) Reinspection of Schools, (4) Principal Interviews, (5) Management Plan Evaluation, (6) Parent and Teacher Notification Survey, (7) Original Inspector Survey, (8) Parent and Teacher Notification Focus Groups, and (9) Maintenance and Custodial Worker Focus Groups. Under EPA guidance, Westat designed the specifics of these tasks, including selecting the sample frames; designing instruments; conducting the reinspections, focus groups, and surveys; analyzing the results; and writing this final report on the findings.

1.2 Description of AHERA

The Asbestos Hazard Emergency Response Act (AHERA, Public Law 99-519) was signed into law on October 22, 1986. The law required the EPA to promulgate regulations to address all aspects of asbestos-containing building materials (ACBM) in schools. The EPA published two regulations in response to the mandate. The first (April 1987) was the Model Accreditation Plan (40 CFR Part 763, Appendix C to Subpart E). The second regulation (October 1987) was the Asbestos-Containing Materials in Schools Rule (40 CFR Part 763 Subpart E). It was then the responsibility of the LEAs to carry out the requirements of the legislation.

The first step a LEA must undertake in complying with the AHERA regulations is to have a thorough inspection of each school building performed by an EPA-accredited inspector. During the inspection, all areas of the building are visually examined to identify suspect ACBM. Each distinct homogeneous area of suspect ACBM (material determined to be of the same type and age and uniform in color and texture) is either assumed to be asbestos-containing material (ACM), or random bulk samples of the material are collected to determine asbestos content by laboratory analysis. Each homogeneous area of suspect ACBM is described, at a minimum, by material type, quantity, and location(s) within the building.

If the homogeneous area contains ACBM, (either assumed or determined by laboratory analysis) the inspector must further determine whether the material is friable. A friable material may be crushed, pulverized, or otherwise reduced to powder by hand pressure. If the material is friable, the inspector must assess both the actual damage and the potential for damage to the material. The inspector must date and sign the inspection report, thus taking personal responsibility for the information contained therein.

AHERA requires that a Management Plan contain, among other things, a report of the inspection to be developed by an EPA-accredited Management Planner. The Plan must include an inventory of each building at the school, the information generated by the inspection for each building, laboratory analysis results, ACBM classification, and recommendations for response actions for TSI and each friable ACBM by functional space.[1] AHERA also requires an evaluation of resources needed and a schedule to carry out the response actions and other asbestos activities in the school, the maintenance of a copy of the Management Plan at the school, submission of the Management Plan to the State governor's office, and filing all documents related to asbestos activities in the Management Plan. Several activity plans must be described in the Management Plan. These include an Operations and Maintenance (O&M) Plan for working with friable asbestos materials, a plan for periodic surveillance of the ACBM at least every 6 months and for reinspection of the ACBM at least every 3 years, a plan for notification of parents and staff about asbestos activities, and a plan for initial and periodic cleaning of areas where friable ACBM is present. The Plan must also identify the person assigned by the LEA to ensure that the requirements of AHERA are properly implemented (the AHERA designated person or ADP). Both the management planner and the ADP sign the Management Plan, thus taking responsibility for their respective roles.

AHERA lists response actions which must be performed depending on ACBM type, condition, and classification. Appropriate response actions include placing the material in an O&M Plan, repairing damage to the material, encapsulating or enclosing the material, or removing the material. AHERA specifies the procedures for performing response actions. These procedures include training and accreditation of workers, reference to proper work practices, and detailed methodology for collecting air samples as the clearance criteria for labeling a response action complete. In addition, a schedule for gradually introducing transmission electron microscopy as the method for clearance air monitoring is provided.

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[1] Functional space is defined as a room or group of rooms designated by the management planner as one space for purposes of response actions.

A unique feature of AHERA is the requirement that workers and building occupants, or their legal guardians, be notified at least once each school year about the availability of the Management Plan and about other asbestos activities. Other activities include response actions and periodic reinspections that are planned or in progress. Written notification to either individuals or groups is usually considered acceptable.

The AHERA regulations recognize that maintenance and custodial workers in a building perform a variety of tasks which may impact asbestos in a variety of ways. Therefore, training of these workers is defined for two categories, based on the likelihood their work will disturb ACBM. A two-hour training is required for all workers in a building containing ACBM, whether or not they work directly with the ACBM. An additional 14 hours of training is required for all workers who conduct activities that will result in the disturbance of asbestos. Short-term workers in a building must be informed about the locations of ACBM.

Additional items discussed in the regulations include placing of asbestos warning labels adjacent to friable asbestos materials in maintenance areas, and enforcement guidelines. Exclusions, methods by which various otherwise required elements may be deleted, are also described by AHERA. For example, bulk sampling may be waived if previous sampling is determined by the accredited inspector to have been performed in substantial compliance with the regulation.

1.3 Study Tasks

Nine study tasks were developed to provide the data needed to fulfill the study objectives. These study tasks were:

Task 1: School screening and sample selection

- A sample of AHERA designated persons representing a total of 1,400 schools nationwide was called to determine school and building eligibility for the study.
- A sample of buildings within eligible schools was selected systematically, including primary and backup buildings.

Task 2: AHERA designated person interviews verifying building eligibility for the evaluation

- Two interviews were conducted in person with the ADP for each school in the sample. One determined training provided to school maintenance and custodial staff and the other collected a copy of the school's Management Plan.

Task 3: Reinspection of schools

- Field teams conducted reinspections of selected buildings within sampled schools in order to collect data to later compare to the original AHERA inspection.

Task 4: Principal interview

- The principal of each school in the sample was interviewed in person to learn about the methods used for notifying parents of the presence of a Management Plan at the school.

Task 5: Management Plan evaluation

- A Management Plan evaluation was conducted for each school in the sample. This task compared the findings of the reinspection and original AHERA inspection and evaluated the completeness and usability of each school's Management Plan.

Task 6: Parent and teacher notification survey

- A telephone survey of one active parent and one active teacher for each school in our sample was conducted to learn about methods used for notifying parents and teachers of the presence of a Management Plan at the school.

Task 7: Original inspector survey

- Telephone interviews with inspectors responsible for the original AHERA inspections of schools in our sample were conducted to determine inspector qualifications and background at the time of the original AHERA inspection.

Task 8: Parent and teacher notification focus groups

- Focus groups were conducted in four locations nationwide with parents and teachers not associated with the schools in our sample. Groups discussed potential reactions to different styles of notifications.

Task 9: Maintenance and custodial worker focus groups

- Focus groups were conducted in five locations nationwide with maintenance and custodial workers not associated with the schools in our sample. Groups discussed maintenance and custodial worker training and tasks regularly performed in schools.

Further description of each of these tasks is found in Chapter 2 of this report.

1.4 Research Areas and Design

A multifaceted research design was developed to conduct the nine separate research tasks for this project. A total of 16 forms for data collection, abstracting, interviewing, and conducting building reinspections were developed and used. These forms included two in-person questionnaires, three telephone questionnaires, one building reinspection form, and two separate Management Plan abstracting forms for each school.

Six research areas were investigated, and the quantitative data required to address them were collected in a national statistical survey of schools and school buildings. The building sample was a multi-stage stratified cluster sample in which 30 Primary Sampling Units (PSUs), 200 schools within PSUs, and 210 buildings within the schools were selected. A PSU is a geographic area, usually a county or group of counties, defined by the Bureau of the Census for survey sampling purposes. Of these, 198 schools and 207 buildings in schools were successfully included in the study.

Schools were considered eligible for the study if classes in any of grades 1 through 12 were taught, the school had a Management Plan, and the school had at least one eligible building. Buildings were considered eligible if they were built before October 1988 and had been inspected for asbestos-containing materials since December 1987, if the original AHERA inspection discovered some ACBM or suspect-assumed ACBM, and if students in any of grades 1 and 12 were in the buildings on a regularly scheduled basis during the 1989-1990 school year. In total, the sample represents 83,840 of the estimated 106,032 schools nationwide and as such, represents approximately 80 percent of schools nationally.[2]

The research design for the six research areas and the basic questions to be answered in each are presented on the following pages. These research areas and the questions to be answered were developed primarily by the EPA in consultation with Westat and the technical consultants used by this project. These technical consultants were James August; William Ewing of the Environmental Management Group; Steven Hays of Gobbell Hays Partners, Inc.; Dale Keyes of Environmental Sciences, Inc.; and David Mayer of Law Associates, Inc. (formerly with Georgia Technical Research Institute).

Research Area 1: School Building Reinspection

Questions:

- Was all the suspect material found at the original AHERA inspection?
- Was the asbestos found at the original AHERA inspection properly assessed?

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[2] Quality Education Data, Inc., Denver, Colorado, 1988.

Method:

Using information collected during the ADP interview and school reinspection (Tasks 2 and 3), each building in the study was given a thorough reinspection for suspect materials, that is, building materials suspected of containing asbestos. During the reinspection the type, location, amount of material, and condition of the material were recorded. Bulk samples of suspect material were not taken.

Management Plans were reviewed for all schools in the study as part of the Management Plan evaluation. Each Plan was reviewed, based on the data collected during the reinspection of schools (Task 3), by experienced Management Plan reviewers who compared the findings of the original AHERA inspection and the reinspection on a material-by-material basis. The results of this comparison allowed us to determine when the findings of the two inspections differed significantly, and to determine potential reasons for these differences.

Research Area 2: Management Plan Evaluation

Question:

- Do schools know and understand the regulation, as shown by the completeness of the Management Plan?

Method:

Management Plans for each school were reviewed and evaluated for completeness and usability, as were specific components of each Management Plan, such as notifications (Task 5). Completeness was evaluated using a checklist adapted from the EPA Key Elements Checklist (See Appendix E) utilized by many States. Usability was evaluated in terms of the level of education or knowledge considered necessary in order to understand and use the Management Plan.

Research Area 3: Response Action Evaluation

Questions:

- What response actions were recommended in the Management Plan?
- Are they appropriate, given the assessed condition of the asbestos?
- Have the remediations undertaken in the school been done properly?

Method:

The first two research questions were answered by reviewing Management Plans to determine the types of response actions recommended (Task 5). These recommended response actions were reviewed to determine whether they were appropriate given the findings of the original AHERA inspection, whether they were specific to the material or generic, and whether they met or exceeded the AHERA standards. The third research question was answered via direct evaluation of completed remediation observed during the reinspection of schools (Task 3). Remediation was visually evaluated during the reinspection (no air sampling was performed).

Research Area 4: Original AHERA Inspection Evaluation

Question:

- Given the quality of the original AHERA inspection, as shown by a comparison between the reinspection findings and the findings presented in the Management Plan, what is the importance of the original AHERA inspector's training, experience, and background in inspection quality?

Method:

The original AHERA inspectors for the schools in our sample were interviewed by telephone (Task 7) to determine their training, experience, and background at the time they conducted the original AHERA inspection in the sample schools. These characteristics were then compared with the results of the original AHERA inspection, using data gathered as part of the Management Plan evaluation (Task 5). Each inspection was assigned a numerical score based on the original AHERA inspector's performance on six key elements of the inspection. Analyses were conducted of the association between the inspection score and dimensions of the original AHERA inspector's background.

Research Area 5: Process of Notification

Questions:

- Who has been notified?
- Were these people notified through a letter, meeting, article in a school newspaper, or in another way?
- After notification occurred, did parents review the Management Plan, attend meetings to discuss asbestos in the school, or respond to notification with any other action?
- What might parent and teacher reactions be to differently worded notification letters?

Method:

The first three research questions were addressed during an interview with each school's principal (Task 4) about the notification of parents which they had undertaken. In addition, Westat conducted telephone interviews with parents and teachers (Task 6) about their recollections of being notified.

The final research question was conducted through in-depth discussions in focus groups with parents and teachers from schools outside our sample (Task 8). These parents and teachers were questioned about their reactions to various types of notification letters.

Research Area 6: Maintenance and Custodial Worker Training and Experience

Questions:

- Are maintenance and custodial workers trained to work with and around asbestos?
- What topics were included in this training?

- What tasks relative to asbestos or suspect ACBM are regularly required of maintenance and custodial workers, and do these tasks correspond to the level of training received?

Method:

Two study approaches were used in this research area. The first approach was interviews with each school's ADP (Task 2). These interviews covered the type of training given to maintenance and custodial personnel, the duration of this training, and the topics covered. The second approach involved focus groups with maintenance and custodial personnel at schools other than those in our sample (Task 9). In addition to discussing the types of training received by maintenance and custodial staff, these groups discussed the types of work workers are asked to undertake around asbestos.

1.5 Final Report

This final report presents data addressing the six research areas outlined on the preceding pages. Descriptive statistics are projected to the U.S. as a whole for the aspects of the research areas that collected quantitative data. The qualitative aspects of the research areas are presented both by generalizing the data to the national level and by reporting the findings of each group, as is common for focus group reports.

Chapter 2 presents an overview of the methodology for the study. Chapters 3 through 9 present a summary of the Research Areas, organized as follows:

- School Building Reinspection (Chapter 3);
- Management Plan Evaluation (Chapter 4);
- Response Action Evaluation (Chapter 5);
- Original AHERA Inspection Evaluation (Chapter 6);
- Process of Notification (Chapter 7);
- Maintenance and Custodial Worker Training and Experience (Chapter 8); and
- Additional Research Findings (Chapter 9).

Text within the chapter devoted to each Research Area is organized by research question. Selected data required to address each research question are presented within the chapter. Exhibits are also presented in these chapters, as needed, to highlight specific findings and address the study's research questions. The basic analysis tables and data plots are not included with this report.

Chapter 10 outlines the statistical properties of the sample, including a discussion of response rates and the methodology used for weighting, imputation, and variance estimation. The appendices present the data collection forms, focus group guides and summaries, Management Plan completeness item results, the EPA Key Elements Checklist, contact letters, a statistical technical appendix, and assessment score tables.

2. METHODOLOGY OVERVIEW

Chapter 2 presents the methodology for sample selection of the buildings within schools, the primary sample for the AHERA Evaluation Study. Protocols for conducting the building reinspections are presented to provide the background necessary to understand the complexity of the reinspection procedures. Then, the early efforts of this study through implementation, the pretest, the contact with the Local Education Agencies, and the field data collection effort are discussed on a task-by-task basis. The Management Plan evaluation aspects of this study are presented and include the original inspector evaluation effort. Finally, the telephone interviews with parents and staff and with original inspectors are discussed, as are the notification and maintenance/custodial workers focus groups.

2.1 Sampling Methodology for the AHERA Building Sample

The building sample for the AHERA study was selected in several stages which are summarized here. For a more detailed statistical description of how the buildings were selected, see Appendix G.

First, 30 primary sampling units (PSUs) were selected from a list of all the PSUs in the continental United States. A PSU is a limited geographic area, often a county or cluster of counties. The PSU boundaries for the AHERA evaluation were based on those used by the Bureau of the Census.

Next, a screening sample of 1,041 schools was chosen from the schools in the 30 selected PSUs. The schools included at this stage were the public, private, and Catholic schools on the 1988 QED file (Quality Education Data, Inc., Denver, Colorado).

Then, a primary sample of 200 schools was selected from those schools that were eligible for the AHERA evaluation after screening. Eligible schools were those which had students in any of grades 1 through 12, had a Management Plan, and had at least one eligible building as described below. Schools were sampled at different rates in each PSU in order to control the workload in each PSU. Replacement schools were used when schools in the primary sample did not participate. Participation was voluntary and, of the original sample, 25 percent did not participate. While we did not ask why the schools chose not to participate, some volunteered reasons such as limited resources, not enough staff available to respond to the questions, and lack of time.

Finally, 207 buildings were selected from the eligible buildings in the 198 schools that agreed to participate. An eligible building had students in any of grades of 1 through 12 and had a Management Plan. In 189 of these schools, one building was selected, and in 9 of them two buildings were selected. No more than two buildings were selected from any school since the number of inspections that could be performed was limited and both building-level and school-level statistics were desired.

2.2 Building Inspection Protocols

2.2.1 Definition of a Building

One of the first questions to be answered when conducting any survey of buildings is, 'What definition of a building will be used?' For this study, we defined a single building as a separate structure. Two structures sharing an interior wall were considered one building, even though they were constructed at different times or were considered by the school to be more than one building. Two structures connected only by an aboveground (covered or uncovered) or underground walkway were considered two buildings, even if the school considered them one building. Where the school shared an interior wall with a non-school "building" (e.g., a community center or public library), only the school portion of the building was to be inspected.

This definition of a building was used throughout the study and facilitated statistical analysis. It is important to note, however, that due to definitional differences, the number of buildings we found at a school often was different from the number the district, and even the school, reported. In one notable case, the district defined a school as having one building, despite the fact that 14 temporary buildings and two permanent structures were present according to the definitions used in the AHERA evaluation.

2.2.2 Materials Included

In order to design the inspection protocols, the project team had to decide which materials and areas would be included and which excluded from the study. The list of materials included is presented in Exhibit 2-1. All materials in Exhibit 2-1 are considered to be identifiable in any complete AHERA inspection. The "Type" column lists materials for which study inspectors were specifically trained to inspect. An "Other" type listing was provided on data collection forms in the event the inspectors found a material not on the list, but also not **excluded** from the study. The "Data aggregates" column shows how the field data were combined for statistical analysis. For example, interior and exterior duct insulation were combined as "duct". Thus, when duct is mentioned in the analytical chapters, it refers to both interior and exterior duct insulation.

2.2.3 Excluded Materials and Areas

Four types of materials were excluded from the evaluation. They include:

1. Materials excluded by AHERA, either because they do not contain asbestos or they are not building materials, even though they do contain asbestos (e.g., fiberglass, brake shoes);
2. Materials not addressed clearly by AHERA (e.g., smooth paint);
3. Materials which are considered "suspect" under AHERA but infrequently contain asbestos and are present in such large quantities that a massive effort would be needed to assess them, while providing little information to the study (e.g., sheetrock and drywall which are sometimes called wallboard, hard plaster walls); and
4. A few small quantity materials included in AHERA but which would be difficult to assess (e.g., caulking, installed gaskets).

The list of materials excluded from the study is presented in Exhibit 2-2.

All areas within a building were inspected except those that were either inaccessible (e.g., a key to a storage closet was unavailable) or considered by the inspector to be unsafe to enter. Explicitly included in the study were crawlspaces, rooftops, mechanical areas, boiler rooms and attics, where accessible. Exhibit 2-3 shows how areas were classified for the study.

4

Exhibit 2-1. Material types included in the AHERA evaluation

Thermal system insulation		Surfacing materials		Miscellaneous materials	
Type	Data aggregates	Type	Data aggregates	Type	Data aggregates
Breeching Boiler Chiller Duct - exterior Duct - interior Elbow Fitting Pipe Tank Tee Valve Other (SPECIFY)	Breeching Boiler Duct - interior/exterior Elbow/Fitting/Value/Tee Pipe Tank Other: Chiller	Ceiling material - hard and granular/cementitious Ceiling material - fluffy Ceiling material - soft and granular Ceiling material - textured paint or popcorn Fireproofing - hard and granular/cementitious Fireproofing - fluffy Fireproofing - soft and granular Wall coating - hard and granular/cementitious or stuccoed Wall coating - fluffy Wall coating - soft and granular Wall coating - textured paint or popcorn Other (SPECIFY)	Ceiling material Fireproofing Wall coating/Other	Acoustical wall tile Ceiling tile - glue on Ceiling tile - lay in Ceiling tile - spline Cooling tower slats Fire doors Floor tile - 9" x 9", 1' x 1' Fume hood sheeting Linoleum or solid floor covering Patch Radiator board Rope insulation Transite -ducts Transite - panels Transite - water pipe (interior) Vibration dampening cloth on ducts Other (SPECIFY)	Acoustical wall tile Fire doors VDC Floor Tile - 9" x 9", 1' x 1' Transite - ducts, panes, & pipe Ceiling tile - glue on, lay in, & spline Other: Cooling tower Slats Fume hood sheeting Patch Radiator board Rope insulation Other

Exhibit 2-2. Material types excluded from the AHERA evaluation

MATERIALS SPECIFICALLY EXCLUDED BY AHERA

- Auditorium curtains
- Brake shoes
- Bunsen burner pads
- Carpet
- Chalkboards
- Cinder blocks
- Concrete blocks
- Cork materials
- Fiberglass materials
- Fire blankets
- Foamglass materials
- Glass materials
- Kiln bricks
- Laboratory gloves
- Laboratory tabletops
- Metal materials
- Plastic materials
- Roofing materials, exterior
- Rubber materials
- Stored materials
- Structural concrete
- Styrofoam materials
- Tectum-board
- Wood materials

EXCLUDED FROM STUDY FOR OTHER REASONS (SEE TEXT)

- Adhesives (other than with floor tile)
- Caulking
- Electrical wire insulation
- Fire brick for boilers
- Flooring under wall-to-wall carpeting
- Gaskets
- Hard plaster walls
- Light socket collars
- Masonite materials
- Paint, smooth
- Sheetrock/drywall
- Terrazzo flooring
- Vinyl wallpaper

Exhibit 2-3. Area classification for the AHERA evaluation

EXTERIOR AREAS

- Portico
- Covered connecting walkway

GENERAL ACCESS

- Auditorium (fixed chairs)
- Classroom (includes closet)
- Classroom group (classroom & one or more of bathroom & office)
- Dining room (cafeteria)
- Gymnasium
- Gymnasium equipment room
- Hallway, interior
- Laboratory
- Library/Media center
- Lobby/Entryway
- Locker room
- Multipurpose room (2 or more of cafeteria, gym, assembly)
- Restroom
- Stage
- Stairway
- Student dormitory bedroom
- Swimming pool
- Weight/Exercise room

LIMITED ACCESS

- Garage, underground
- Janitor's closet
- Kitchen
- Office
- Storage/Supply room
- Teachers' lunch room
- Teachers' lounge

MECHANICAL AREAS

- Air and duct shaft
- Air handling units
- Air plenum
- Boiler room
- Crawl space
- Elevator shaft or equipment
- Mechanical room
- Pipe shaft
- Rooftop HVAC unit
- Space above dropped ceiling (non-air plenum)
- Telephone and electrical

2.2.4 Bulk Sampling

The decision was made by the EPA not to perform bulk sampling as part of this study. Instead, bulk sample results from the original AHERA inspection were extracted from the Management Plans and used to classify suspect material as ACBM or non-ACBM.

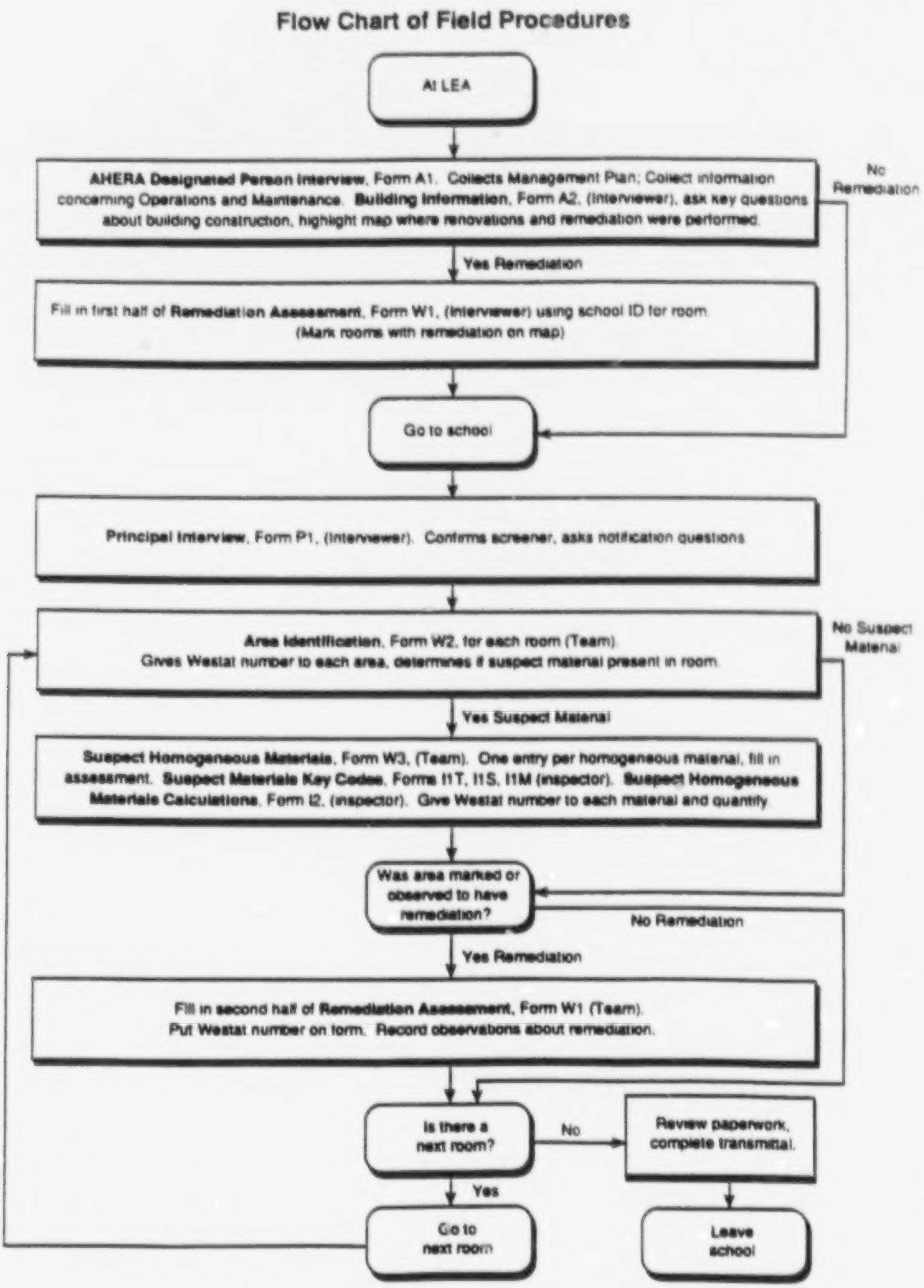
Early in the project there was considerable discussion about the desirability of collecting and analyzing bulk samples of suspect material during the building reinspections. This discussion recognized that the only way to determine positively that suspect material is ACM is through bulk sampling, but questioned the importance of this determination given the research questions to be answered by the study. The discussion also focused on the additional costs associated with bulk sampling. These included not only the costs of laboratory analyses, but also the cost of greater inspector time spent on each inspection, the costs of inspecting schools only when students and other building users were not present, and possible loss of school participation if bulk samples had to be collected.

Research Area 1, which studied school reinspections, asked two questions. The first question, "Was all the suspect material found at the original AHERA inspection?", addressed all materials regardless of asbestos content. The presence of asbestos in the suspect material should not affect the quality of an inspection. Moreover, despite the fact that bulk samples were not collected, the study determined the percent of suspect asbestos-containing material identified by the original AHERA inspection. The second question, "Was the asbestos found at the original AHERA inspection properly categorized?", depended on the results of the original bulk samples. Taken together, each of these questions required that the maximum number of buildings be included in the evaluation. This was necessary to decrease the size of confidence intervals for projections for all parts of the evaluation.

2.2.5 Field Procedures

The specific field procedures followed for the evaluation are described in the following sections. Exhibit 2-4 will be helpful in understanding these procedures. This Flow Chart of Field Procedures shows which data collection forms were used during each step of the field process.

Exhibit 2-4. Flow chart of field procedures


Flow Chart of Field Procedures
At LEA
AHERA Designated Person Interview, Form A1. Collects Management Plan; Collect information concerning Operations and Maintenance. Building Information, Form A2, (interviewer), ask key questions about building construction, highlight map where renovations and remediation were performed.
No Remediation
Yes Remediation
Fill in first half of Remediation Assessment, Form W1, (interviewer) using school ID for room. (Mark rooms with remediation on map)
Go to school
Principal Interview, Form P1, (interviewer). Confirms screener, asks notification questions.
Area Identification, Form W2, for each room (Team). Gives Westat number to each area, determines if suspect material present in room.
No Suspect Material
Yes Suspect Material
Suspect Homogeneous Materials, Form W3, (Team). One entry per homogeneous material, fill in assessment. Suspect Materials Key Codes, Forms I1T, I1S, I1M (inspector). Suspect Homogeneous Materials Calculations, Form I2, (inspector). Give Westat number to each material and quantify.
Was area marked or observed to have remediation?
No Remediation
Yes Remediation
Fill in second half of Remediation Assessment, Form W1 (Team). Put Westat number on form. Record observations about remediation.
Is there a next room?
No
Review paperwork, complete transmittal.
Yes
Go to next room
Leave school

2.3 Pretest of Data Collection Procedures and Forms

After preliminary development of the forms for this study, three Local Educational Agencies (LEAs) in the Washington, D.C. metropolitan area were selected to participate in the screening pretest. The pretest screening questionnaire was administered to three LEAs to obtain information on 14 schools, 10 public and 4 Catholic, representing 7 elementary schools, 3 middle schools, and 4 high schools. Of these 14, 11 were urban/suburban and 3 were rural. The procedures for contacting the LEAs were the same for the pretest as for the actual field study, as described in Section 2.4.

After the screening questionnaire was administered, and school and building eligibility was determined, a total of four schools were included in the field portion of the pretest. Three schools were public and one was Catholic, while two were elementary schools and two were middle schools. One school was in a rural area while the remainder were in suburban or urban communities. Again, procedures for contacting the LEAs and schools were the same for the pretest as for the actual field study. For each of these schools the following steps were undertaken:

- The ADP was interviewed to verify school and building eligibility. The school's Management Plan was also collected at this point (Form A1). Questions about school practices for training maintenance workers were added to this form after the pretest.
- The ADP was interviewed about the maintenance and construction history of the building selected for the reinspection for the pretest (Form A2).
- The school principal was interviewed about the types of notifications given to parents (Form P1).
- A building reinspection to inspect for suspect asbestos-containing material (Forms I1, W2 and W3) and to inspect for different types of response actions (Form W1) was conducted in selected rooms throughout the school. A sample of rooms in each school was inspected to minimize costs of these pretest inspections.

The findings of the pretest were used to improve the various questionnaires and data collection forms, to improve field procedures, and to determine the type of training materials required to instruct interviewers and inspectors in the field procedures.

After the data were collected and preliminarily analyzed, a report was sent to each pretest ADP and school principal to inform him or her of the locations of all suspect asbestos-containing materials located during the pretest reinspection of the school.

2.4 Contacting the Local Education Agencies and Schools

2.4.1 School Eligibility and Sample Selection - Task 1

A letter of introduction to the study was written to each Local Educational Agency responsible for one or more schools in the screening sample. This screening sample consisted of 1,041 schools in 30 PSUs nationwide. This was the first contact with the LEA. The letter was addressed to the superintendent in the case of public or Catholic schools, and to the principal in the case of private schools. Attached to the letter was a request from Mr. Charles Elkins, Director of EPA's Office of Toxic Substances, encouraging schools to participate. The letter was addressed simply to "Superintendent", since EPA was not informed who participated in the study. A copy of both letters was also sent to the AHERA designated person (ADP) for each school system. (Sample initial LEA contact letters are presented as Appendix F.)

Approximately two weeks after these letters were mailed, trained Westat telephone interviewers called each LEA and requested to speak with the person in charge of the district's asbestos program. When that person was located, he/she was asked his/her name, and the screening questionnaire was administered to determine school and building eligibility in the study. A copy of this data collection instrument is presented in Appendix A.

This questionnaire was administered on a school-by-school basis and, as a result, some ADPs were requested to answer the questionnaire for each sampled school in their district that was in our screening sample.

The screening questionnaire was designed to determine not only **school eligibility** but also **building eligibility** for the study. At the school level, eligibility was determined by affirmative answers to the following questions:

- Does the school currently have classes in any of grades 1-12?

- Does this school have an asbestos Management Plan?

At the building level, after the ADP listed all of the buildings on the school campus, affirmative responses to the following questions determined building eligibility:

- Was this building built before October 1988?[1]
- Has this building been inspected for asbestos since December 1987?[2]
- Did the inspection discover asbestos-containing materials or suspect ACM in this building?
- Are there students in any of grades 1-12 in this building on a regular basis?

In addition, the ADP was asked the following questions about each building:

- What is the size of this building?
- Since December 1987, was removal, enclosure, or encapsulation of asbestos-containing material performed on three or more linear feet, or three or more square feet, of material in this building?

The answers to these questions were used in sample selection as described in Appendix G.

2.4.2 Scheduling Interviews and Inspections

After the screener data were collected, key entered and cleaned, the primary sample of 200 schools was drawn. Westat wrote a letter to the ADPs of the selected schools, informing them that specified schools in their district had been selected for inclusion in the study. (See Appendix F.)

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[1] AHERA allows buildings built after October 12, 1988 to be excluded from inspection if an architect, project engineer, or accredited inspector signs a statement that no ACBM was specified as a building material in any construction document or, to the best of their knowledge, no ACBM was used as a building material.

[2] AHERA became effective in December 14, 1987, so any inspection after that date is assumed to be in response to AHERA.

Each ADP was then called and asked to participate in the study, and an appointment was made for the Westat field team to visit the ADP. Either the ADP or Westat then contacted the school principal to schedule the building reinspection and principal appointment. In either case, a letter from Westat and a letter from Mr. Elkins of the Office of Toxic Substances was sent to the principal with information about the study and requesting the school's participation (see Appendix F).

Thirteen field teams, each composed of a Westat interviewer and an EPA accredited expert[3] asbestos inspector, traveled to 30 PSUs during a 10-week field period. Prior to the field period, Westat conducted a 3½ day training session in Rockville, Maryland. The training was designed to familiarize the teams thoroughly with the purpose of the study, the field procedures, and the data collection forms.

The appointments were scheduled during three waves of data collection. Each wave spanned approximately three weeks. Table 2-1 provides further detail on the effort during each wave.

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[3] All inspectors used for this evaluation meet or exceed the criteria set forth in the National Asbestos Council's March 1989 Model Plan for Reciprocity. This plan states that: Experience is required of the applicant in performing the field work portion of asbestos inspections in buildings and/or industrial facilities, including collecting bulk samples, categorizing ACM, assessing ACM and preparing inspection reports. Experience may be gained acting as an Inspector, being in responsible charge of Inspectors or being under the responsible charge of an Inspector. Any experience gained after December 17, 1987, must be gained acting as an Inspector accredited according to AHERA, being in responsible charge of persons accredited as Inspectors according to AHERA, or being under the responsible charge of an Inspector accredited according to AHERA.

An applicant with a bachelor's degree in engineering, architecture, industrial hygiene, science or a related field must have at least six months' experience as described above. An applicant with a two-year associate's degree in engineering, architecture, industrial hygiene, science or a related field must have at least 12 months' experience, as described above. Related fields acceptable for prequalification of Inspectors shall be determined by the PRC. It shall be the responsibility of the applicant to demonstrate to the satisfaction of the PRC that a degree in a related field is adequate for prequalification as an Inspector. An applicant with a high school degree must have at least 24 months' experience as described above.

Table 2-1. Field effort by wave

Time period[1]	Number of field teams	Number of PSUs visited[2]	ADP interviews	Principal interviews	School buildings inspected
3/20 - 4/6	13	16	86	84	90
4/12 - 5/2	12	20	81	83	84
5/3 - 5/25	8	11	31	31	33
Total		30	198	198	207

[1] All waves occurred in 1990.

[2] Some PSUs were visited during more than one wave.

2.5 Field Data Collection

The field data collection effort for the AHERA Evaluation Study was carried out within a three-month period and involved travel to 30 PSUs as described earlier. During this effort, interviews were conducted with ADPs and school principals, Management Plans were collected, and building reinspections were performed. This section presents the methodology used to complete this effort. A copy of all forms used in the data collection effort is presented in Appendix A.

2.5.1 AHERA Designated Person Interviews - Task 2

The initial in-person meeting with the ADP usually took place in his/her office, close to the LEA's records of asbestos remediation and inspection findings. In most cases the inspector and interviewer were present for this interview. In some cases the inspector was not present, and the interview was conducted by the interviewer alone.

During this interview, the ADP was asked questions about all the schools selected for inclusion in the study in his/her district. In some cases, the ADP answered the same questionnaire several times, once for each selected school.

Form A1: AHERA Designated Person Interview

The AHERA Designated Person Interview was the first of two in-person questionnaires administered to the ADP. Since this is a school-based form, one Form A1 was filled out for each school selected within that LEA. All questions on this form were asked by the interviewer and three types of information were obtained: building eligibility and re-selection, Management Plans, and maintenance and custodial training.

Building Eligibility and Reselection - Each building in each school in the sample must have had a predetermined chance of inclusion in the sample. For this reason, the screening questionnaire was re-administered to verify the eligibility of each building in each school, and buildings were reselected for inclusion in the study where eligibility had changed. (See Appendix G.)

Management Plans - One of the central tasks for the AHERA evaluation was to collect Management Plans for each school in the sample. A Management Plan is a document prepared in response to AHERA that presents the findings of the AHERA inspection for asbestos-containing materials, an outline of recommended response actions for the school, and other asbestos-related information. For this study, a copy of the Management Plan was requested with emphasis on obtaining at least five key elements of each school's Management Plan. These elements were: (1) the building inspector's report, (2) response action recommendations, (3) the school's Operations and Maintenance Plan (O&M Plan), (4) copies of notifications, and (5) copies of AHERA clearance air monitoring results for response actions (where available). The interviewer collected each Management Plan and sealed it in an envelope. The inspector did not review the Management Plan prior to the reinspection.

Maintenance and Custodial Worker Training - Under AHERA each school is required to conduct asbestos "awareness" training for school-employed custodians and maintenance workers who work around asbestos. Form A1 asked questions about this training in order to review compliance with, and adequacy of, training.

Form A2: Building Information Questionnaire

The Building Information Questionnaire (Form A2) was completed by the interviewer after completion of Form A1. Form A2 was used to obtain information about the selected building's construction and asbestos history to help the inspector perform an efficient and thorough building reinspection. It also collected information about the building's layout and building systems.

If the inspector was present during the interview, he/she was encouraged to ask followup questions to ensure a good understanding of the mechanical systems in the building and the building's history. From this form, only data about building age were key entered for potential analysis. The remainder of Form A2 was intended solely to provide building information to the inspector.

Form A2 is a building-based form, and one form was completed for each building; two forms were completed in schools for which two buildings were sampled.

The Master Floorplan - A master floorplan of the selected building was obtained from the ADP and marked to show the building's construction dates and asbestos remediation history. This Master floorplan was used throughout the building reinspection to record area IDs and information discovered during the reinspection.

Form W1: Remediation Assessment

Form W1 was used by the interviewer to record only remediation taken by the school as reported by the ADP. Only the first half of the form was completed during the ADP interview; the remainder was completed during the reinspection.

Form W1 is an area-based form; one Form W1 was completed for each area where remediation was reported or observed. During the ADP interview, Form W1 was used to collect three kinds of information:

Room Name or Number - The interviewer recorded the room name or number where a response action occurred, as reported by the ADP.

Respondent - The interviewer recorded the respondent, usually the ADP, who provided information regarding the location of a response action.

Description of Material and Remediation - The interviewer recorded the ADP's description of the asbestos material and the remediation taken.

The remainder of Form W1 was completed during the reinspection and is described further in Section 2.5.2.

2.5.2 Reinspection of Schools - Task 3

The building reinspection was one of the central field research activities of this project. Both the interviewer and inspector participated in the reinspection, with the interviewer recording the information on the three "W" (reinspection) forms, and the inspector recording the information on the two "I" (inspector) forms.

In most cases, the reinspection began in the boiler room and proceeded from lower floors to upper floors. Crawlspaces were inspected last. If particular conditions at a school made an alternative starting point in the building preferable, this was allowed. All areas of the building were to be inspected, though provisions were made for recording an area as inaccessible when keys were unavailable, an area was sealed or otherwise inaccessible, or an area was considered by the inspector to be unsafe either structurally or through excessive asbestos contamination.

Form W2: Area Identification

The Area Identification Form (Form W2) was the first form used during the inspection (though the first part of Form W1 may have been filled out during the ADP interview). Form W2 was used to identify uniquely and categorize each area inspected and to record number of suspect homogeneous materials present in each area, if any. It also recorded whether remediation action had been taken in the area, thus prompting the interviewer to complete Form W1, where required.

Form W2 is a building-based form, meaning that one row of the form was used to record data on a specific area in a building. In a building with 10 or fewer areas, only one form was used. An area was generally a distinct room within the building. However, some areas are not typically thought of as rooms, e.g., hallways, stairwells, and closets. One purpose of the building reinspection was to collect data to compare with the original AHERA inspection. As different inspectors divided schools into areas in many different ways, inspecting materials on a room-by-room basis provided enough detail to allow comparison with the original AHERA inspection report.

The Area Identification form was used to collect four types of information:

Area IDs - The use of Westat-assigned, sequential ID numbers permitted an organized comparison of areas from our reinspection to those of the original AHERA inspection.

Area Use Code - Pre-coded area use identifiers were used to categorize areas into exterior, interior or mechanical areas and then into sub-areas such as classrooms. A "No Access" code was provided for cases where the area was locked or otherwise not accessible (e.g., the area above a dropped ceiling that did not have movable panels).

Number of Suspect Homogeneous Materials - This information was used as a check by data entry personnel to ensure that the correct number of rows were completed on Form W3 for each area.

Remediation - This information was used to prompt the interviewer to complete Form W1. Several sources of information on remediation were used, including the ADP's report, inspector observation, and comments of school staff observing the reinspection.

Form W3: Suspect Homogeneous Materials

The Suspect Homogeneous Materials Form (Form W3), was used to record all suspect homogeneous materials found by the inspector in an area, the quantity of each material, and the assessment factors used to calculate the AHERA 1-7 category for each material. These categories are specified by AHERA and assess the current and potential damage found in suspect TSI, surfacing and miscellaneous material in a school. The interviewer was responsible for completing Form W3 with the assistance of the inspector. The seven AHERA categories are described later in this section.

Form W3 is an area-based form; that means one Form W3 was completed for each area where suspect homogeneous materials were found. If no suspect homogeneous materials were found in an area, no W3 Forms were used for that area. Form W3 was used to record three types of information:

Suspect Homogeneous Material Key Code - This code was generated by the inspector on Form I1T for TSI, Form I1S for surfacing material, and Form I1M for miscellaneous material. Each distinct homogeneous material in the area was identified, quantified, and assessed.

Suspect Homogeneous Material Dimensions - Information was collected on the amount of each suspect material in each area in square or linear feet or inches. Provisions were made for the team to record dimensions directly in square or linear feet when this was more convenient, or for area dimensions to be calculated by computer from the recorded length and width.

Damage - Data on current damage and potential for damage were collected for use in determining the AHERA 1-7 category for the homogeneous materials in the area. These damage categories were assigned by computer, based on the answers to questions about friability, current levels of local and dispersed damage, and potential for damage from sources such as water and vibration.[4] These categories are:

1. Damaged or significantly damaged thermal system insulation ACM;
2. Damaged friable surfacing ACM;
3. Significantly damaged friable surfacing ACM;
4. Damaged or significantly damaged friable miscellaneous ACM;
5. ACBM with potential for damage;
6. ACBM with potential for significant damage; and
7. Any remaining friable ACBM or friable suspected ACBM.

Forms I1: Suspect Homogeneous Materials Key Code

There are three Form I1s, one for each of the three general AHERA material types: TSI, surfacing, and miscellaneous. They are called Form I1T, I1S, and I1M, respectively, and were used to generate a unique identification number for each suspect homogeneous material found in a building. These forms were color-coded by material type to facilitate finding the appropriate form.

Form I1 is a building-based form. The inspector completed one row of the appropriate form each time a new suspect homogeneous material was found. This form was designed to collect two types of information about the suspect asbestos-containing materials in the school:

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[4] For a variety of reasons, no standardized decision protocol has been developed by the EPA for use in classifying material. The procedure outline above was developed strictly for the AHERA evaluation to facilitate uniformity in data collection.

Materials - Each suspect homogeneous material found was given an identification code which was unique within the school. This reduced the paperwork associated with completing the other reinspection forms and speeded data entry.

Material Type - Commonly-found materials were pre-coded. Material types which were intentionally excluded from the scope of this study were also listed on these forms. This saved team members' time which might have been spent assessing materials unnecessarily. (For a comprehensive list of materials excluded from the study, see the three I1 Forms in Appendix A or Exhibit 2-2., pg. 2-5.)

Form I2: Suspect Homogeneous Materials Calculations

The Suspect Homogeneous Material Calculations Form (Form I2) provided space for inspectors to calculate the quantity of a homogeneous material in one area. The inspector recorded on this form any field notes taken, though he/she was not required to fill in the form for a specific material or area. Form I2 is a building-based form; one row was filled out for a homogeneous material in an area. Information on this form was not key entered.

Form W1: Remediation Assessment

The Remediation Assessment Form (Form W1) was initially used by the interviewer during the ADP interview to record reported remediation taken by the school. The interviewer then completed the form during the reinspection by recording the inspector's observations about the quality of the remediation performed and any additional remediation discovered by the inspector or reported by any other respondent during the reinspection.

This form covered information not normally addressed in an AHERA inspection. Its overall purpose in the study was to determine if remediation occurred, what remediation was occurring, and the visual quality characteristics of the remediation. For purposes of this study, remediation means that more than three square feet or three linear feet (3lf/sf) of material were removed, repaired, enclosed, or encapsulated. The size limitation for defining remediation was established by the research team based on the guidance EPA provided in Asbestos in Schools: A

Guide to New Federal Requirements for Local Education Agencies (USEPA, February 1988). This documents states, on page 22, that "major fiber release episodes, those more than 3 square or linear feet of friable ACBM, or maintenance activities other than small-scale, short-duration, are not considered O&M activities..." Given the absence of a clear definition of "small-scale, short-duration activity," the expert panel agreed that 3 lf/sf would be the appropriate size limitation for this evaluation.

Form W1 is an area-based form, and one Form W1 was completed for each area where remediation occurred. If no remediation occurred in an area, no Form W1 was used for that area. Form W1 was used during the reinspection to collect three types of data:

Confirmation of Remediation - Since the initial description of remediation was obtained away from the school during the ADP interview, we anticipated that there might be some discrepancies found in the field. This aspect of the form addressed whether the initial information was correct or could be verified. If it was not verifiable, the reason was recorded.

Classification of Remediation - The inspector classified the remediation into one of four categories--enclosure, encapsulation, removal, or repair. The inspector performed the classification in accordance with specific definitions for this study, rather than relying on terminology used by the ADP. The goal was for all types of remediation to be classified uniformly by all inspectors.

Observations/Quality Factors - Five visually determined factors indicative of quality factors (lamination, complete barrier, impact resistant, airtight, and material removed) were observed by the inspector to evaluate the quality of the remediation by looking at specific remediation characteristics. The quality factors for enclosure were "airtight" and "impact resistant." If the enclosure was not airtight or was not impact resistant, it was not considered visually adequate. The quality factors for encapsulation were "lamination" and "complete barrier"; for repair, "lamination" and "visually airtight"; and for removal, only the presence of the material.

2.5.3 Principal Interview - Task 4

Soon after the ADP meeting, usually the day of the building reinspection, the school principal was interviewed by the Westat interviewer. The introduction to the interview briefly summarized the AHERA study for the principal and referenced a letter previously sent. The first questions verified the school's eligibility for the study. The majority of the remaining questions asked about notifications sent by the school to parents regarding asbestos activities performed in the school. Finally, names and phone numbers of representatives of teachers' unions and parents' groups were obtained. These representatives were interviewed by telephone in Task 6, the Parent and Teacher Notification Survey.

Form P1: Principal Interview

Form P1 was used primarily to collect information on notifications by the Westat interviewer from each school's principal.

Notification - Notification is the process by which the school informs parents and staff about the availability of a Management Plan and other activities pertaining to asbestos in the school. Common methods of notification are: an article in a regularly-issued school newsletter; a special letter sent to parents specifically about asbestos-related activities in the school; or an official press release approved by the school. The notification may originate in the LEA, perhaps the ADP's office, or the superintendent's office, and be distributed by the school. For purposes of this study, notification does not include informal talks with teachers or other school staff, or newspaper articles other than official school press releases.

2.6 Management Plan Evaluation

2.6.1 Management Plan Evaluation - Task 5

Evaluation of the Management Plans collected in Task 2, the ADP Interview, was a multifaceted task which involved looking at each Management Plan from two totally different perspectives. The first perspective was as an historic document, to be reviewed without reference to any of the findings of Westat's reinspection. The second perspective was as a form for presenting the findings of the original AHERA inspection which were then compared with Westat's reinspection findings. Two primary forms were used to review the Management Plans, and each viewed a plan from one or the other of these perspectives.

Primary review of the Management Plans using forms M1 and M2 was performed by Susan Viet and Eva Clay, both senior AHERA-certified Management Planners. Both reviewers are Certified Industrial Hygienists, and each has over five years of experience as asbestos inspectors, consultants, and educators. A secondary quality assurance review of selected Management Plans was conducted by Dale Keyes, a respected expert in the field of asbestos management and control.

Form M1: Management Plan Checklist

The Management Plan Checklist (Form M1) viewed the Management Plan as an historic document, asking questions related to the completeness, usability, and content of the Management Plan, and presenting a structure for "grading" each Plan. The general structure of this form followed the EPA Key Elements Checklist (Appendix E), used by the Agency to determine the completeness of a Management Plan according to the criteria established by AHERA.

No attempt was made in Form M1 to compare any findings of Westat's reinspection (even such findings as the number of buildings in a school) with those presented in the Management Plan. For instance, Question 3 asked, "Is the name and address indicated for each school building on the inventory?" In this case, as in all others on this form, we looked for **internal** consistency rather than that the Management Plan agree with our findings.

Form M1 evaluated the completeness of the Management Plan in the following areas:

- General Inventory (10 points);
- Exclusion/Inspection Information (70 points);
- Response Action Recommendations (30 points);

- Activity Plans (39 points);
- Resource Evaluation (10 points); and
- Presentation of the ADP's Qualifications (6 points).

The maximum possible score was 165 points. Scores were then normalized to a 1-100 scoring scheme. In addition to reviewing these mandatory elements of a Management Plan, Form M1 collected information on the presence of Transmission Electron Microscopy (TEM) and Phase Contrast Microscopy (PCM) clearance air monitoring results.

Usability questions for this review covered the presence or absence of non-mandatory, but very helpful Management Plan components such as numbered pages, a definitions section, and a program organization chart. Form M1 also requested the reviewer to determine the characteristics of a person who could use and understand the Management Plan, from both the perspective of educational level, and the perspective of the person's knowledge of the school's buildings and experience with AHERA asbestos inspection.

Form M2: Management Plan Comparison Report

The Management Plan Comparison Report (Form M2), was a computer-generated form that presented the findings of the Westat reinspection (Task 3, Reinspection of Schools) on a material-by-material basis. This form also had areas for the Management Plan reviewer to fill in the findings of the original AHERA inspection for each material found by Westat. The specific questions asked about each material included:

- Was the material found in this room at the original AHERA inspection?
- What was the quantity of material found at the original AHERA inspection?
- Were bulk samples of this material taken and, if so, how many?
- Was the material assessed and, if so, were AHERA 1-7 categories used for this assessment?
- If the material was found to contain asbestos, was a response action recommended, was it appropriate, and was it a "specific" or a "generic" response?

The results of this comparison were used to generate the Original Inspector's Performance Score.

2.6.2 Original AHERA Inspector's Performance Score

Each original AHERA inspector was scored or graded on a scale of 0 to 40 on the quality of his/her performance during the reinspection conducted in any schools in our sample. The score was generated by averaging each inspector's material-by-material performance in answer to questions about the identification of suspect material, the appropriateness of material assessment, the number of samples taken, etc.

2.7 Telephone Interviews

Task 6, Parent and Teacher Notification Survey, and Task 7, Original Inspector Survey, were both conducted as telephone interviews from Westat's headquarters office in Rockville, Maryland.

2.7.1 Parent and Teacher Notification Survey - Task 6

The Parent and Teacher Notification Survey (Task 6) was a telephone survey of active parents and teachers whose names were provided to us by the principal of each sampled school. In some cases a postcard was given to the principal to give to the selected respondent so that the respondent could mail to Westat a telephone number where he/she could be reached. One parent and one teacher for each school were called and asked about any asbestos notifications that they recalled receiving from the school since December of 1987.

Form N1: Parent And Teacher Notification Interview

Questions in the Parent and Teacher Notification Interview followed closely those in the Principal Interview (Form P1). In each case the respondent (parent or teacher) was asked if he/she remembered whether one or more notifications went to parents and, if so, how many and when. The respondent was then asked about notification format (e.g., letter, meeting, or newsletter) and about the content of the notification. He/she was also asked if there was any particular reaction to the notification. The questions were then repeated for notifications to teaching staff.

2.7.2 Original Inspector Survey - Task 7

In the Original Inspector Survey (Task 7), Westat called the inspectors who conducted the original AHERA inspection for each school in the sample. Where only one inspector was identified as performing the inspection, all efforts were made to track and interview that inspector. Where more than one inspector was identified as performing the inspection, only the most senior inspector, Management Plan author (if also an inspector), or inspection team leader was called.

Form O1: Original Inspector Interview

The Original Inspector Interview (Form O1) was a telephone survey form which was used to learn the inspector's qualifications **at the time that the original AHERA inspection occurred**. We were interested in the following qualifications:

- Level of formal education;
- Technical or vocational education and certifications;
- Number of asbestos inspections performed, both AHERA and non-AHERA; and
- Number of years of work experience in such fields as construction, industrial hygiene, and engineering.

The results of this interview were combined with the Original Inspector's Performance Score, and a statistical analysis of inspector performance and qualifications was performed.

2.8 Focus Groups

A total of nine focus groups were conducted in five locations nationwide. Four focus groups were with parents and teachers of local public and private schools not included in our sample. The other five were with maintenance and custodial workers from schools not included in our sample.

"Focus group" discussions, or "intensive group interviews," provide a flexible tool for exploring respondent awareness, behavior, concerns, beliefs, experience, motivation and practices related to a particular topic. The focus group is a small discussion group of eight or so people, led by an experienced moderator who is skilled at bringing out full discussion of the issues. The moderator guides the discussion in order to identify points of consensus, as well as differing views and the reasons behind the differences.

The focus group approach is used to develop qualitative insight rather than quantitatively precise or absolute measures. The results of these focus groups cannot be considered a statistical data collection methodology as the recruiting of participants cannot be replicated. Also, the flow of conversation cannot be repeated to allow the exact same questions in the same order to be asked of other respondents. Instead, this type of research is intended to provide depth of knowledge, awareness, and opinions.

The moderator uses a discussion guide, structured to collect qualitative data, similar to a questionnaire in a formal survey, to lead the group. (The discussion guide for the parents' and teachers' groups is presented in Appendix B, and the discussion guide for the maintenance and custodial workers is presented in Appendix C.) This guide presents general areas for discussion, rather than a list of questions to be read verbatim. Departures from the guide and probing of areas that arise are often highly valuable.

2.8.1 Parent and Teacher Notification Focus Groups - Task 8

Westat conducted four focus groups with parents and teachers not associated with schools in our sample. These groups were held in St. Louis, Boston, Seattle, and New Orleans. Each group had 10 or more participants from public, private, and Catholic schools.

The focus groups were tape recorded for subsequent analysis. Even though respondents were aware of the recording, they quickly became oblivious to it. Each focus group was analyzed, and a written summary was prepared shortly after the group met. These summaries, which included the discussion guide for the group and examples of notifications, are presented in Appendix B. Finally, in the synthesis of results, all groups were analyzed collectively, general themes were identified, and any contrasts of responses from group to group were presented.

Topics discussed included:

- The level of participant knowledge about asbestos in the school and sources of that knowledge;
- Participant reaction to three examples of notifications; and,
- Participant reaction to differing methods of notification (e.g., mail or newsletter).

2.8.2 Maintenance and Custodial Worker Focus Groups - Task 9

Five focus groups with maintenance and custodial workers were conducted in St. Louis, Boston, Seattle, New Orleans, and Bethesda, Maryland. Participants were recruited from public, private, and Catholic schools not in our sample, and no supervisory personnel were invited to attend. The maintenance and custodial worker focus groups were videotaped. Even though respondents were aware of the recording, they quickly became oblivious to it. Each focus group was analyzed and a written summary was prepared shortly after the group met. These summaries are presented in Appendix C. Finally, in the synthesis of results, all groups were analyzed collectively, general themes were identified, and any contrasts of responses from group to group were presented.

Topics included:

- Participant knowledge of asbestos in their schools both prior to AHERA and after AHERA;
- Participant knowledge of and utilization of the school's Management Plan;

- The length, scope, and format of participant training in asbestos management; and
- Participant job responsibilities and techniques used around asbestos-containing material.

2.9 Description of the Sample

All data analyses presented in Chapters 3 through 9 are national estimates based on a nationwide statistical sample of schools and school buildings. The data were projected to the population of schools or buildings by multiplying the amounts found as a result of this evaluation by the weights described in Chapter 10. There are an estimated 106,032[5] schools in the nation. This number excludes Department of Defense schools, libraries, universities, prison schools, and State Departments of Education. The school-level estimates used in the evaluation represent all schools nationally that would be eligible for the AHERA evaluation. There were an estimated 83,840 such schools. Eligible schools were those which taught classes in any of grades 1 through 12, had an asbestos Management Plan during the 1989-1990 school year, and had at least one eligible building as described below. Estimates of eligible buildings were statistically derived from data gathered during both the screening and field portions of the evaluation. There were an estimated 189,022 eligible buildings contained in the eligible schools. The resulting building-level estimates represented all buildings nationally that were eligible for the AHERA evaluation. Eligible buildings met the following conditions:

1. School building was in an eligible school;
2. School building was built before October 1988;
3. School building was inspected for ACM since December 1987;
4. The inspection discovered some ACM or suspect ACM; and
5. Students were regularly in the building during the 1989-1990 school year.

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[5] Quality Education Data, Inc., Denver, Colorado, 1988.

These eligible schools and school buildings constituted the study population for all Research Areas. Due to the eligibility requirement, the AHERA evaluation results apply only to eligible schools and eligible buildings in those schools, not to all schools and buildings in the country. At least 72 percent of schools nationwide were eligible for the AHERA evaluation. If we assume the schools that were not contacted or refused to participate in the screening were eligible to participate in the evaluation with the same frequency as contacted schools, then the sample could represent as much as 79 percent of all schools in the nation. Table 2-2 shows the estimated percentage of schools nationwide by eligibility status, based on the results of the screening.

Table 2-2. The percentage of schools nationwide, by eligibility status

Eligibility status	Percent
Eligible	72
Ineligible	18
No grades 1-12	(4)
No Management Plan	(1)
No eligible buildings	(13)
No contact	4
Refusal	6

Sampling errors are associated with estimates based on probability samples like the one used in the AHERA evaluation. The sampling errors in Appendix G were used to construct "difference tests" to determine statistically significant differences (for example, between principals and parents or between maintenance workers and custodians). Differences between two groups are considered statistically significant if the observed difference is "unlikely" to have resulted from random variation. In this case, it is more reasonable to attribute it to real differences in the underlying populations. "Unlikely" is generally quantified as the probability of a larger difference than the one observed 0.05 or less, assuming only chance variation.

Estimates found in Chapters 3 through 9 are often followed by a number in parenthesis for example, "... 80 percent (± 6%) of schools nationally ..." The number in parentheses may be used to form a 95 percent confidence interval for the estimated value. In the example, the 95 percent confidence interval would be 74 percent to 86 percent. Confidence intervals indicate the likely size of the difference between the sample estimate (80% in the example) and the unknown population parameter. In the example, there is one chance in 20 that the difference exceeds 6 percent.

All confidence intervals in Chapters 3 through 9 are approximate, computed by applying normal distribution theory. As such, confidence limits for percentages may occasionally be above 100 percent or below 0 percent. This usually occurs when the sample is small and the estimated percentage is near 100 or 0 percent. Where this occurs, the impossible confidence limit should be replaced with 100 percent or 0 percent as appropriate.

3. SCHOOL BUILDING REINSPECTION

Research Area 1 addresses the AHERA inspections performed in the nation's elementary and secondary schools. Two research questions were posed for investigation, "Was all the suspect material found at the original AHERA inspection?" and "Was the asbestos found at the original AHERA inspection properly assessed?". Data for both questions were obtained by conducting a **reinspection** of a statistical sample of 207 school buildings and comparing the results of the reinspections with the **original AHERA inspection** results as reported in the schools' Management Plans. A number of technical terms are used in this report. Their definitions are collected in the **Glossary** at the front of this report. The terms are in boldface when first used in this chapter.

In order to ensure the objectivity and validity of the reinspections, they were performed "blind". That is, the reinspectors had no access to the Management Plans or prior knowledge of where asbestos currently existed in the sampled schools. They were however, informed by the ADP of locations in which asbestos had been remediated. Thus, the comparisons of the original AHERA inspections and the reinspections were of two independent inspections of a school building.

The related terms **suspect materials** and **asbestos-containing materials** (more precisely, **asbestos-containing building materials**) are used extensively throughout this report. Since these terms are not synonymous, the distinctions among them need to be clarified. Suspect materials are suspected of containing asbestos because, before 1980, they were frequently manufactured using asbestos. Examples of suspect materials include pipe insulation, boiler insulation, spray-on acoustical surfacing material, ceiling tile, and vinyl floor tile. Suspect materials are generally divided into three broad **material categories:** thermal system insulation, surfacing materials, and miscellaneous other materials. Each category is subdivided into more specific and descriptive **material types** such as pipe insulation, fire proofing, and floor tile. AHERA regulations define specific suspect building materials to be inspected in schools.

It is impossible for a visual examination of a particular suspect material to determine if that suspect material does in fact contain asbestos. It is necessary to submit samples of the material (known as **bulk samples**) to laboratory analysis to determine what percent of the material is asbestos. If the material contains more than one percent asbestos, it is considered asbestos-containing material (ACM). If the ACM is a building material, it is more precise to call it asbestos-containing building material (ACBM).

In many asbestos inspections, including those under AHERA, some suspect materials are not submitted to laboratory analysis. Instead, the inspector and building owner agree to assume that the material contains asbestos and treat it accordingly. This assumption is generally made to save laboratory costs when materials are much more likely to be ACM than asbestos-free, or to avoid potential fiber release associated with cutting into undamaged materials such as floor tile.

The objective of both the original AHERA inspections and the reinspections was to identify, describe, locate, assess, and quantify each homogeneous suspect material in the school building. A **homogeneous material** is uniform in color, texture, and appearance; was installed at one time; and is unlikely to consist of more than one formulation of ACBM. Thus, 9" by 9" and 1' by 1' floor tile would be two different homogeneous materials of the same type. A particular suspect material was considered to be **identified** in the original AHERA inspection if it was reported in the Management Plan, in any manner. Locating suspect homogeneous materials means to report the locations of the material in the building. Suspect materials are generally quantified as square feet of surface covered by the material. A few materials, most notably pipe wrap, are quantified as linear feet of insulated pipe.

In order to compare original AHERA inspection and reinspection results, it was necessary to estimate the actual quantity of each suspect material present in the building at the time of the original AHERA inspection. This quantity is referred to as the **total amount** in the building. It is defined as the quantity of material found by the study team during the reinspection, unless removal of some or all of the material was reported.[1] In cases where removal has occurred, the total amount is defined as the larger of the quantities reported in the original AHERA inspection or reinspection. This definition presumes that no new suspect material has been added since the original AHERA inspection; replacement of materials does not affect the study results.

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[1] An alternative definition for the total amount in the building that was considered is the sum of the reinspection quantity and the amount removed in a remediation (if any). This alternative definition could not be implemented because data on amounts of ACBM removed were not available.

We believe the reinspection findings provide a reliable basis for evaluating the original AHERA inspection, for the following reasons:

- All inspectors performing the reinspections met or exceeded the criteria set forth in the National Asbestos Council's March 1989 Model Plan for Reciprocity. This plan outlines experience and educational background well in excess of the basic three-day training mandated by EPA for building inspectors.
- Our inspectors received a 3 ½ day training specific to the study, to standardize field procedures within the group of reinspectors.
- Two-person teams reinspected each building, each member having clearly defined roles. The inspector was required to make actual measurements of each suspect material using a measuring device (estimating or "eyeballing" was not permitted). The other team member was an interviewer who recorded the inspector's observations.
- Realistic scheduling of reinspections allowed teams plenty of time to perform complete and thorough reinspections.
- Our data collection forms were designed with internal checks which ensured that all required quantity, location, and assessment information was collected for each material found.
- Selected schools were reinspected a second time, based on irregularities discovered in the paperwork.
- Our data processing, key entry and supervisory review were all used to ensure accurate transfer of data to computerized form.
- We conducted expert review of the reinspection reports to provide rigorous checks for potential outliers.

As discussed in Chapter 2, no bulk samples of suspect materials were collected during the reinspections. Instead, we extracted laboratory results from the original AHERA inspection (as reported in the Management Plans) to classify suspect materials as ACBM or non-ACBM. Thus, if a suspect material encountered in the reinspection was identified in the original inspection as ACBM, through either laboratory analysis or assumption, then it was considered to be ACBM for this research. Suspect materials encountered during the reinspection which had not been identified in the original AHERA inspection could not be classified as either ACBM or non-ACBM and thus remained in the "suspect materials" category.

3.1 Suspect Material Found in the Original AHERA Inspections

The basic research question, "Was all of the suspect material found at the original AHERA inspection?" is too general to be answered exactly as stated. There are a number of ways to refine it into meaningful questions that can be answered analytically.

Identification of Materials

- How many of the homogeneous suspect materials in the school building were identified at the original AHERA inspection?
- What percentage of the total amount of suspect material was identified at the original AHERA inspection?
- How many school buildings have one or more suspect materials that were not identified in the original AHERA inspection?

Estimation of Material Quantities

- For materials which were identified at the original AHERA inspection, what was the extent of the underestimation of the quantity of each material?[2]

Recording Material Locations

- For materials which were identified at the original AHERA inspection, was the suspect material recorded in every area where it was present?

Variation in Inspections with Material Type and Area Use

- Do the answers to the previous questions vary with the type, friability or asbestos content of the material or with area use?

The first three questions address the ability of the original AHERA inspections to identify suspect materials. The questions are important because, if a material was not identified, it was not sampled to determine asbestos content. Moreover, it would not have been included in the asbestos management program, even if it was ACBM.

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[2] Overestimation of material quantity at the original AHERA inspection cannot be determined. This is because removal or other remediation may have occurred in the interval between the original inspection and reinspection, thus decreasing the apparent total quantity of material. In addition, overestimation of material would not generally impact most schools, as careful measurements are normally taken prior to remediation.

The fourth question addresses the ability of the AHERA inspections to quantify suspect materials. LEAs need reasonably accurate quantifications of the asbestos materials in their schools to be able to estimate the costs of remediations.

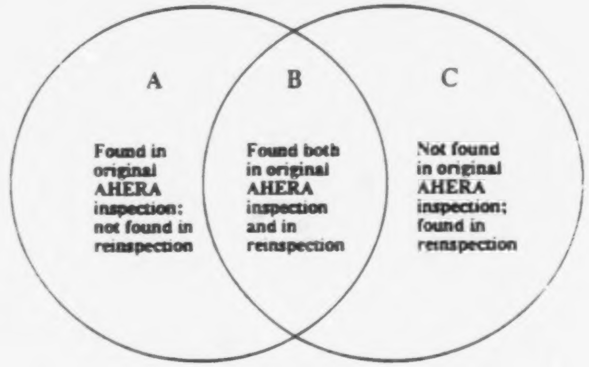
The fifth question addresses the ability of the original AHERA inspections to clearly record all areas in a building where the suspect material is located. This is important because Management Plans should provide school employees and parents with reliable information about the locations of ACBM, and areas that have no ACBM. In particular, school maintenance workers should know where it is necessary to protect themselves from potential exposure to asbestos fibers and where such protections are unnecessary. Clear records of the locations of ACBM and non-ACBM give a worker information with which to differentiate between similar materials.

The last question seeks to determine if the ability of the original AHERA inspection to identify, quantify, and locate suspect materials varies with material types or area use. These relationships are explored within the context of the previous five questions. They are important to consider in order to improve training curricula for asbestos inspectors.

Figure 3-1 illustrates the universe of suspect materials in school buildings and some of the difficulties inherent in evaluating building inspections after the passage of several months or more. The union (areas A. B, and C) of the two circles represents the universe of suspect materials in school buildings at the time of the original AHERA inspection. The circle on the left (areas A and B) represents materials found in the original AHERA inspection. The circle on the right (areas B and C) represents materials found in the reinspection.

In order to estimate the percent of suspect materials identified in the original AHERA inspections, it is necessary to make two assumptions. First, materials found in the original AHERA inspection, but not in the reinspection (area A) are assumed to have been removed in the interim between the two inspections. Second, materials found in the reinspection but not in the original AHERA inspection (area C) are assumed to have been missed in the original inspection, rather than added subsequent to the original inspection. Under these assumptions, the ratio $\frac{A + B}{A + B + C}$ provides an estimate of the percent of suspect materials identified in the original inspections. In addition, we would also like to estimate the fraction of total quantity that the original inspector found (i.e., $\frac{A + B}{A + B + C}$) for square feet or linear feet.

Figure 3-1 Universe of suspect materials in school buildings[3]


A
B
C
Found in original AHERA inspection; not found in reinspection
Found both in original AHERA inspection and in reinspection
Not found in original AHERA inspection; found in reinspection

Unfortunately, the quantity already abated (A) is not known. However, we can calculate $\frac{B}{B + C}$ as a lower bound on $\frac{A + B}{A + B + C}$. These lower bound estimates are reported later in this chapter.

To answer the six questions, Westat compared in detail the results of the study reinspections with the results of the original AHERA inspections, as reported in the Management Plan. To do this, Westat generated a report on the quantity and area locations of every suspect material identified in a building during the reinspection (Form M2, Appendix A). Each Management Plan was then reviewed to determine if the original inspection had identified suspect materials of the same types in the same areas and, if so, what quantities were reported. This information was recorded on Form M2 next to its companion reinspection information.

Some difficulties were encountered in performing these comparisons. Management Plans do not treat non-ACBM consistently. Some report only the negative laboratory findings; they do not describe the material or report its locations. Some Management Plans did not provide area-by-area reports of discovered asbestos, e.g. they reported a particular material as "throughout building". Not unexpectedly, Management Plans reported suspect materials in different, frequently coarser, categories than those employed in the reinspection. For example, they might report "TSI in the boiler room", not subdividing it into boiler insulation, pipe wrap, joint insulation, etc. Many Management Plans recorded areas in a manner that made it difficult to match them with the school floor plans and the reinspection report. Differences in architectural and materials nomenclature between the original AHERA inspections and reinspections, and across LEAs, also complicated the comparisons. Nevertheless, in most cases it was possible to accurately match areas and materials by grouping what the reinspection had viewed as separate areas of a building or separate subcategories of materials. For example, grouping two or three different types of ceiling tiles into one material type sometimes permitted a meaningful comparison between the reinspection findings and the Management Plan. Where the reviewers had reasonable doubt, the original AHERA inspection was given credit for correctly identifying, quantifying or locating a material. In addition, the reviewers used all items within a Management Plan during the comparison process. For example, the original AHERA inspection was given credit for identifying a material which was mentioned only in a laboratory bulk sample report, or for locating a material by highlighting areas on a floorplan, or even if sample locations were listed.

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[3] Diagram for illustration only. Ratios in actual data are not shown.

3.1.1 Identification of Materials

Table 3-1 addresses the first analytical question, "How many of the suspect materials in the school building were identified at the original AHERA inspection?". The table displays national estimates of the total number of materials within AHERA's scope. It also shows the number and percent of these materials identified in the original AHERA inspections, by category of material and by friability. It is important to note that this table deals with all suspect material, and not just ACBM, since asbestos content cannot be determined for the unidentified materials. Note also that TSI is considered in this study to be friable in all instances. Hence, there are no differences between the "All" and "Friable" columns for TSI. The total number of suspect materials is the estimated number of suspect materials in the schools of the time of the original AHERA inspections. It is calculated as the sum of the individual suspect materials found in the reinspection plus the number of materials completely removed since the original inspection. Finally, each suspect material contributes equally to Table 3-1, regardless of the amount of material in each instance.

Friability data for Table 3-1 come from the reinspection report, because Management Plans do not provide that information for unidentified materials. Nineteen materials in the sample had been totally removed at the time of the reinspection, so that friability could not be determined in the reinspection. Seventeen of the 19 materials were TSI. The friability data in the Management Plan were used for the remaining two totally removed materials (surfacing materials).

Table 3-1. Estimated number and percent of suspect materials identified in original AHERA inspections, by material category and friability

Material category	Total number of materials (000)		Number of materials identified (000)		Percent of materials identified	
	All	Friable	All	Friable	All	Friable
Thermal system insulation	243	243	197	197	81%	81%
Surfacing	41	32	27	21	66%	66%
Miscellaneous	687	231	459	146	67%	63%
All materials	971	506	683	364	70%	72%

Interpretation of Table 3-1 requires an understanding of how the table was constructed, which is perhaps best explained by an example. Suppose that the original AHERA inspector visited a school building in which boiler insulation, pipe wrap, elbow insulation, and fireproofing were located. If this inspector identified the boiler insulation, pipe wrap, and elbow insulation, but failed to identify the fireproofing, the following would apply: all three TSI materials would be counted as identified; one surfacing material would be counted as unidentified out of a total of one surfacing material; and three of the four suspect materials in that building would be counted as identified.

Several findings emerge from a review of Table 3-1:

- There were an estimated 971,000 individual suspect materials in schools throughout the nation, of which 506,000 were friable.
- Over all material categories, approximately 70 percent of suspect materials were identified in the original AHERA inspections.
- TSI was more likely than surfacing or miscellaneous materials to be identified in AHERA inspections.
- There was no significant difference in the ability of the original AHERA inspections to identify all suspect materials as compared to only friable materials.

The significance of the findings from Table 3-1 can be better understood by translating the number of materials into the corresponding quantities of material. Table 3-2 displays national estimates of the amounts of suspect materials in school buildings at the time of the original AHERA inspection, and the percentage identified in the original AHERA inspections, by material type and friability. Figure 3-2 graphically presents the information from Table 3-2 for each material category. It is important to keep in mind that Table 3-2 and Figure 3-2 present data for all suspect materials, not just ACBM, and that TSI is always considered friable. It is also important to recall that, as illustrated in Figure 3-1, these estimates are lower bounds for the respective amounts of material.

To understand Table 3-2, read across the row entitled "All surfacing" as: there were 299,751,000 square feet of surfacing material present in schools, of which 86 percent was identified in original AHERA inspections; 241,190,000 square feet of the surfacing material was friable; and 90 percent of the friable surfacing material was identified in the original inspections. Likewise, the

Table 3-2. Estimated quantity present and percentage identified in original AHERA inspections of suspect materials by material type and friability

Material category	Unit of measurement	All suspect material		Friable suspect material*	
		Total amount present (000)	Percent identified	Total amount present (000)	Percent identified
All thermal system insulation	Square feet	45,562	71%	45,562	71%
	Linear feet	89,221	94%	89,221	94%
Breeching	Square feet	9,896	80%	9,896	80%
Boiler	Square feet	11,121	92%	11,121	92%
Tank	Square feet	9,521	99%	9,521	99%
Pipe	Linear feet	65,262	94%	65,262	94%
Elbow/fitting/valve	Linear feet	23,959	95%	23,959	95%
Duct	Square feet	14,603	32%	14,603	32%
Other TSI	Square feet	421	69%	421	69%
All surfacing	Square feet	299,751	86%	241,190	90%
Ceiling material	Square feet	244,913	92%	212,287	89%
Fireproofing	Square feet	38,534	56%	21,567	98%
Wall coating, other	Square feet	16,304	67%	7,340	80%
All miscellaneous	Square feet	4,318,636	89%	2,222,677	85%
Acoustical wall tile	Square feet	23,173	85%	20,396	86%
Fire doors	Square feet	12,255	24%	3,214	8%
Linoleum/solid floor cover	Square feet	29,439	35%	456	38%
Vibration dampening cloth	Square feet	2,408	14%	988	21%
Floor tile	Square feet	1,815,468	98%	80,937	99%
Transite	Square feet	31,659	76%	15,207	88%
Ceiling tile	Square feet	2,399,493	84%	2,097,439	85%
Other miscellaneous	Square feet	4,741	46%	4,040	20%
All materials	Linear feet	89,221	94%	89,221	94%
	Square feet	4,663,949	89%	2,509,429	85%

*Friability was assigned by the reinspectors to all of a homogeneous material in a given room. If more than one percent of a nonfriable material (such as floor tile) was damaged in one room, the total quantity of material in that room was rated as friable. Thus, estimates of quantity of friable materials present may be somewhat elevated.

Figure 3-2. Quantity of suspect material identified in original AHERA inspection, by material category and friability

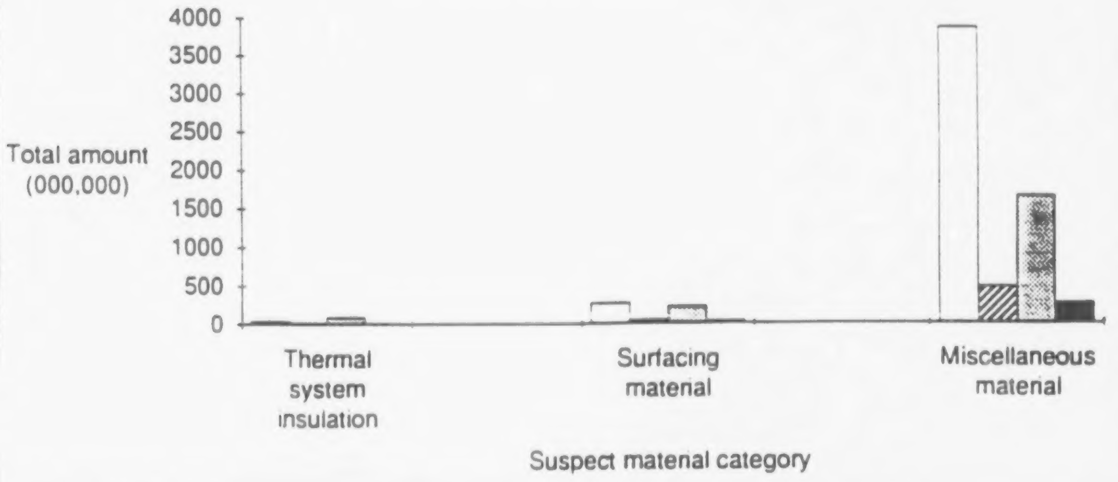
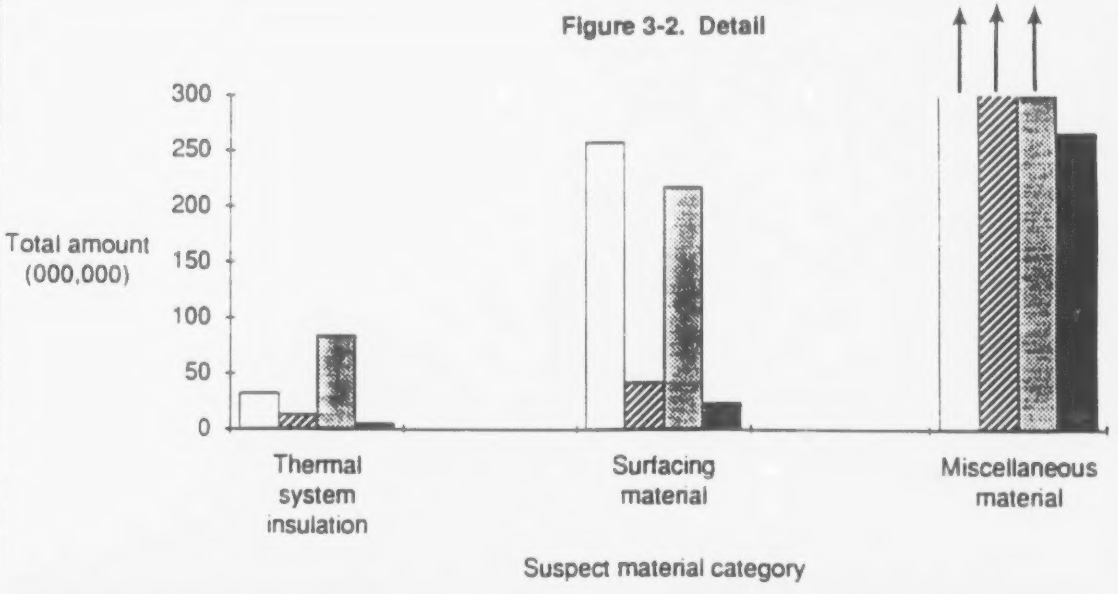


Figure 3-2. Detail



☐ Identified, all (sq. ft. for TSI)

▨ Unidentified, all (sq. ft. for TSI)

▩ Identified, friable only (ln. ft. for TSI)

■ Unidentified, friable only (ln. ft. for TSI) first bar on the left of Figure 3-2 (most easily read on the Detail Figure) reads as: 45 million square feet of friable TSI was present in school buildings, of which over two-thirds (white portion of bar) was identified in original AHERA inspections.

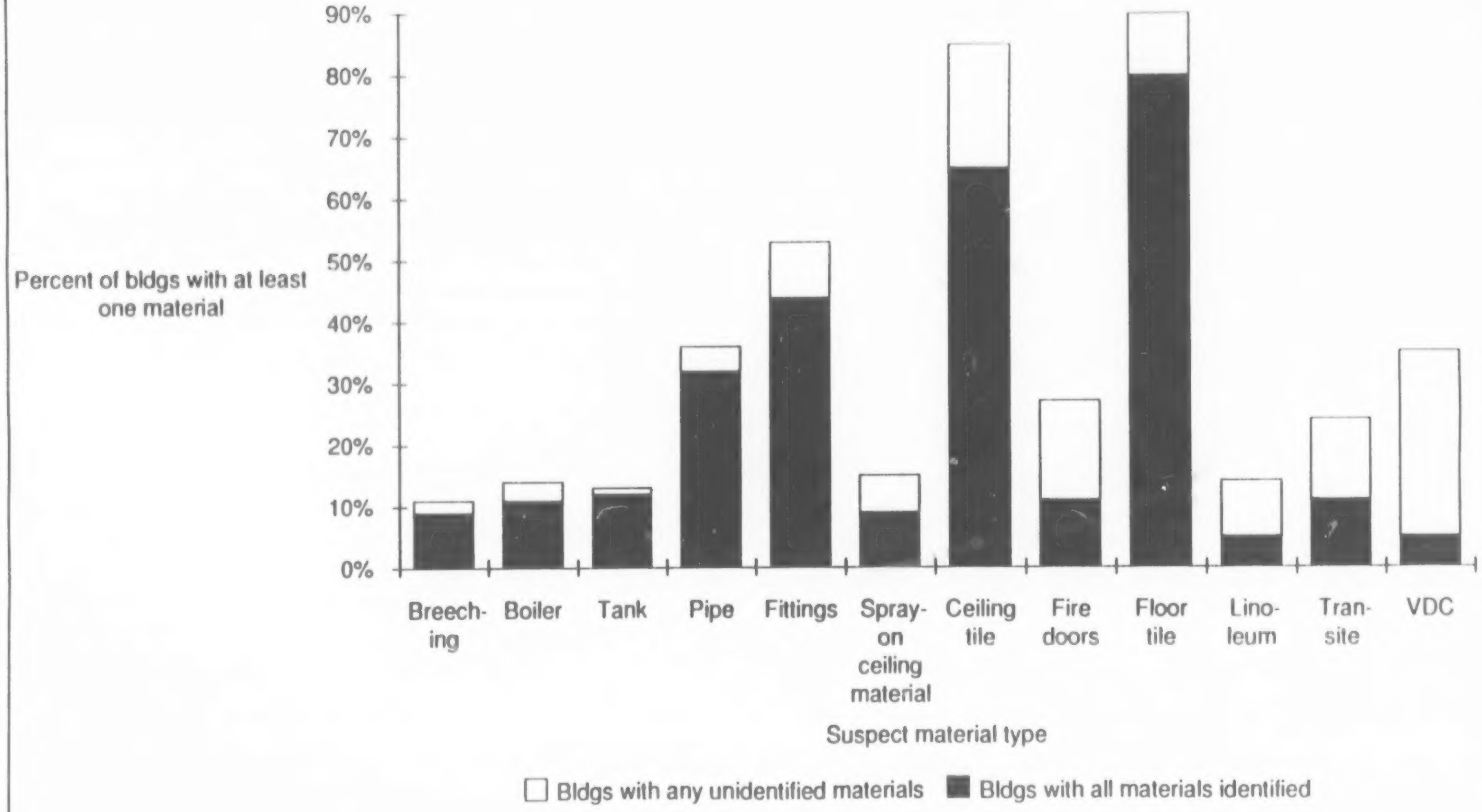
Review of Table 3-2 and Figure 3-2 shows:

- While 70 percent of the total number of suspect materials was identified in the original AHERA inspections (see Table 3-1), 85 percent (± 9%) to 94 percent (± 7%) of the total quantity of material was identified.
- The most frequently identified suspect materials were tank insulation, floor tile, elbow/fitting/valve insulation, pipe insulation, boiler insulation, and ceiling surfacing material. Over 90 percent of the total amount of each of these materials was identified in the original AHERA inspections.
- The least frequently identified suspect materials were vibration dampening cloth (VDC), fire doors, duct insulation, and linoleum. Over 50 percent of these materials was not identified in the original AHERA inspections.
- Few differences were observed in the original inspector's ability to identify all suspect materials as compared to only friable materials. The notable exceptions were fireproofing and wall coatings, where a much higher percent of the friable materials was identified, although the differences are not statistically significant.

Figure 3-3 describes unidentified suspect materials at the building level. It presents data on the percent of buildings that have all materials identified, and at least one material not identified in the original inspection by material type. (Chapter 6, Original AHERA Inspection Evaluation, presents additional related information on this topic.) In this figure, the height of each bar represents the percent of all buildings in which at least one material of the indicated type is present. For example, 90 percent of all buildings in the study have at least one type of floor tile present, and 34 percent of all buildings have at least one type of vibration dampening cloth present.

By looking next at individual bars in Figure 3-3, estimates of how many material types were missed per building inspection can be made. The bar height represents 100 percent of buildings in which a material type was present. The black (lower) portion of the bar visually presents the fraction of buildings in which the material type was identified. The white (upper) portion of the bar visually presents the fraction of buildings in which the material was not identified. Thus, in this figure, the bar labeled "transite" may be interpreted as: 24 percent of

Figure 3-3. Incidence of buildings with suspect materials identified and unidentified in original AHERA inspection, by material type



buildings have at least one transite material present, of which 54 percent have at least one unidentified transite material and 46 percent have all transite materials identified.

The significant findings from Figure 3-3 are:

- TSI materials were more likely than either surfacing or miscellaneous material types to be identified in buildings. Tank insulation was identified in 95 percent (± 5%) of buildings where it was located, and breeching insulation was identified in 79 percent (± 14%) of buildings where it was located.
- Vibration dampening cloth was least likely to be identified (identified in 14%, ± 8% of buildings), followed by linoleum (36%, ± 14%), fire doors (41%, ± 33%), and transite materials (46%, ± 26%), where those materials were present in a building.
- Although ceiling tile and floor tile are common in buildings and were frequently identified, they were not identified in 23 percent (± 12%) and 11 percent (± 8%), respectively, of school buildings with at least one of these materials.
- Spray-on ceiling material was identified in 62 percent (± 36%) of the buildings in which it was present.

3.1.2 Estimation of Material Quantities

The previous discussion dealt with the ability of the original AHERA inspectors to identify materials; unidentified materials were materials found in the reinspection but not mentioned in the Management Plan. We now examine the original AHERA inspector's ability to provide accurate information about the quantities of identified materials. Table 3-3, therefore, focuses our attention solely on the materials identified in the original AHERA inspection and answers the specific question, "What quantity of suspect material was underestimated?". Suspect materials are addressed by material category and friability, as well as by asbestos content. This is because bulk sample results from the Management Plans are available for each of these materials. ACBM includes materials which had positive (greater than 1% asbestos) bulk sample results and materials which were assumed to be ACBM in the original inspection.

Table 3-3. Percentage of material quantities underestimated in original AHERA inspection, by material category, asbestos content, and friability

Material category	Unit of measurement	All suspect material (1)				ACBM (1)			
		Total amount present (000)	Percent under-estimated	Friable amount present (000)	Percent friable under-estimated	Total amount present (000)	Percent under-estimated	Friable amount present (000)	Percent friable under-estimated
TSI (2)	Square feet	32,104	29% (+/-17%)	32,104	29% (+/-17%)	30,450	28% (+/-17%)	30,450	28% (+/-17%)
	Linear feet	83,643	9% (+/-5 %)	83,643	9% (+/-5%)	80,409	9% (+/-4%)	80,409	9% (+/-4%)
Surfacing	Square feet	258,600	10% (+/-10%)	241,191	10% (+/-10%)	76,048	13% (+/-13%)	63,015	12% (+/-12%)
Miscellaneous	Square feet	3,851,839	30% (+/-8%)	1,893,855	41% (+/-12%)	2,108,997	26% (+/-17%)	453,329	55% (+/-45%)
All materials	Square feet	4,142,543	29% (+/-8%)	2,167,150	38% (+/-12%)	2,215,495	28% (+/-17%)	546,794	48% (+/-47%)
	Linear feet	83,643	9% (+/-5%)	83,643	9% (+/-5%)	80,409	9% (+/-5%)	80,409	9% (+/-5%)

(1) Only materials Identified in AHERA inspection are addressed in this table.

(2) TSI = Thermal system insulation.

NOTE: The numbers in parenthesis are 95% confidence intervals.

The determination of underestimated amounts deserves some discussion. Westat recognized that deviations in measurement among inspectors is fairly broad. The expert consultants agreed that an original AHERA inspection quantity within 20 percent of the reinspection quantity should be considered an acceptably accurate estimate. The study team therefore decided to conservatively calculate the underestimated quantity of ACBM by labeling a quantity in a Management Plan as an underestimate only if it was less than 80 percent of the reinspection quantity. Accordingly, a conservative calculation of the underestimated quantity was obtained by taking the difference between 80 percent of the reinspection quantity and the original inspection quantity. If the original inspection quantity exceeded 80 percent of the reinspection quantity, the amount underestimated was set to zero. For example, suppose a reinspection found 500 square feet of boiler insulation, and the Management Plan reported 300 square feet. The underestimated amount would then be (.8)(500) - 300 = 100 square feet. If, instead, the Management Plan reported 420 square feet, the underestimated amount would be zero, since 420 square feet is greater than 80 percent of 500 square feet. The project team and expert consultants agreed that underestimated amounts calculated in this manner would clearly be attributable to underestimations on the part of the original AHERA inspector, rather than to differences in material description, architectural nomenclature, etc.

To interpret Table 3-3, read across the row titled Surfacing as: an estimated 258,600,000 square feet of surfacing material was identified in school buildings, of which 10 percent was underestimated by the original AHERA inspectors. Of the 258,600,000 square feet: 241,191,000 square feet was friable, of which 10 percent was underestimated; 76,048,000 square feet contained asbestos, of which 13 percent was underestimated; and 63,015,000 square feet was both friable and asbestos-containing, of which 12 percent was underestimated by the original inspectors.

Findings in Table 3-3 include:

- The estimated percent of ACBM underestimated ranged from 9 percent (± 5%), for linear TSI, to 55 percent (± 45%), for friable miscellaneous materials.
- The original AHERA inspectors estimated quantities for linear feet of TSI (pipe/joint/elbow/valve insulation [9%, ± 4%, underestimation]) more accurately than for square feet of TSI (boiler/tank/duct insulation [29%, ± 17%, underestimation]).

- There are no statistically significant differences between friable and non-friable materials, or between ABM and non-ACBM, in the percentages underestimated.

Figure 3-4 further characterizes the original AHERA inspections' ability to properly estimate material quantities. It presents estimates of the percent of buildings nationwide that have properly estimated materials by material category, friability, and asbestos content. In this figure, the height of each bar represents the percent of all buildings in which the total amount of a material category was properly estimated, i.e., the material quantity was within 20 percent of the total amount, or more. For example, the far right bar shows that in 47 percent of buildings with asbestos-containing friable miscellaneous material, the total quantity of miscellaneous material was properly estimated.

Several findings are shown in Figure 3-4:

- More than 48 percent of buildings had the total quantity of each suspect material category properly estimated.
- More than 47 percent of buildings had the total quantity of each asbestos-containing material (by category) properly estimated.
- More buildings have properly estimated quantities of surfacing materials and TSI than miscellaneous materials.

3.1.3 Recording Material Locations

While the previous section dealt with underestimated amounts of identified materials, this section continues the analysis of the original AHERA inspectors' ability to provide accurate information about identified materials. It answers the question, "For materials which were identified at the original AHERA inspection, was every area where the material was present recorded?". AHERA requires the locations of suspect materials to be clearly indicated in the Management Plan by blueprints, diagrams, or written description. Table 3-4 displays the estimated national percent of building areas with suspect material present, but not recorded in the original AHERA inspection. This presentation is by type of material and type of area. Table 3-5 presents the same information for ACBM only.

Figure 3-4. Percent of buildings with suspect material quantity properly estimated in original AHERA Inspection, by material category, asbestos content, and friability

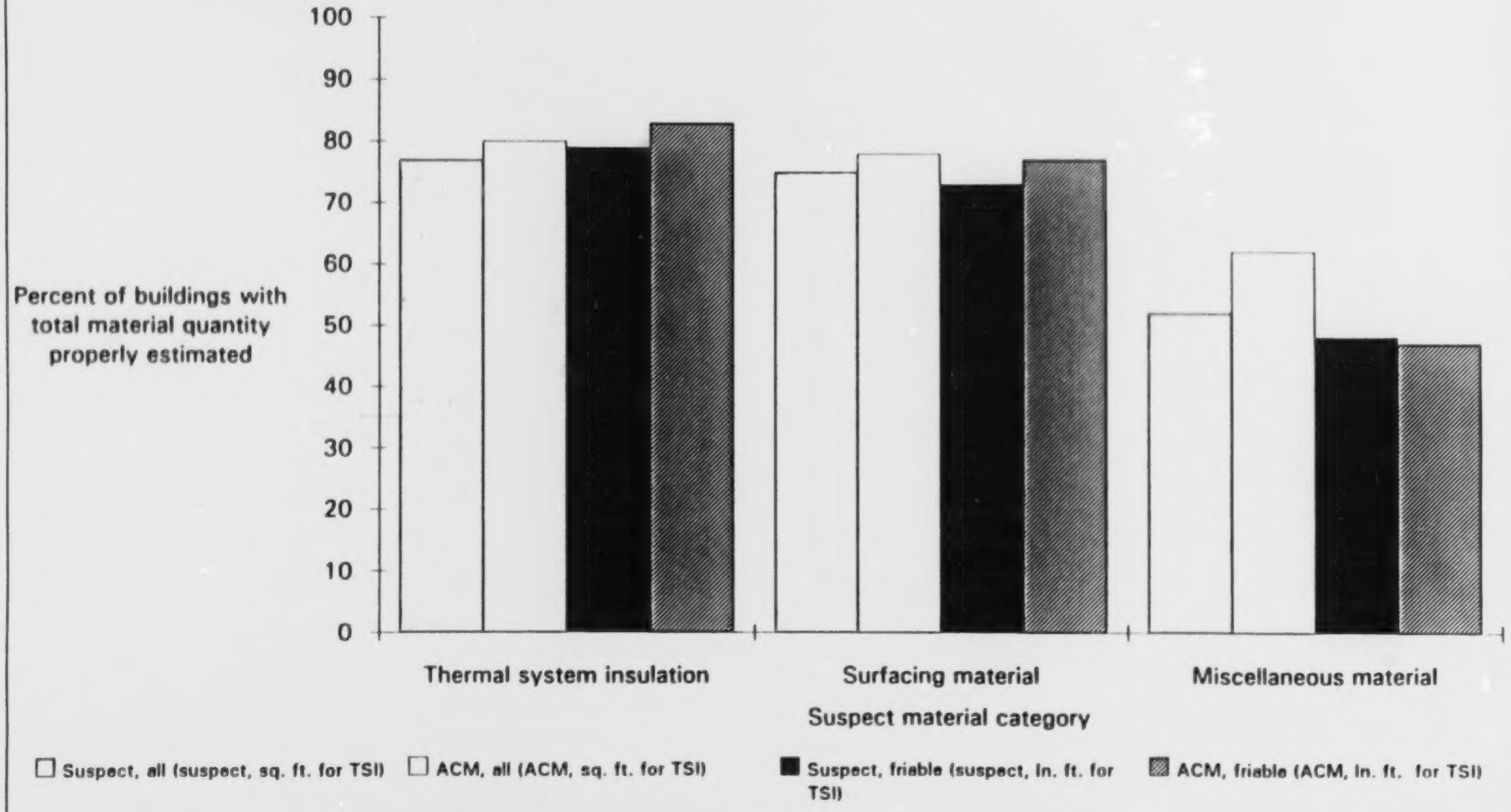


Table 3-4. Estimated percent of areas with suspect materials present, but not recorded in original AHERA inspection, by area type and material type

Type of suspect material	Type of area				All areas
	Exterior	Limited student access	General access	Mechanical	
All thermal system insulation	–	43%	52%	26%	42%
Breeching	–	–	–	12%	13%
Boiler	–	–	–	0%	0%
Pipe	–	32%	50%	21%	37%
Tank	–	–	–	7%	6%
Ducts	–	–	–	29%	46%
Elbow/fitting/valve	–	50%	53%	33%	47%
Other TSI	–	–	–	42%	50%
All surfacing	–	55%	44%	44%	47%
Ceiling material	–	68%	51%	62%	55%
Fireproofing	–	–	10%	23%	13%
Wall coating, other	–	–	–	–	24%
All miscellaneous	13%	50%	43%	43%	45%
Acoustical wall tile	–	–	30%	–	28%
Fire doors	–	70%	72%	47%	66%
Linoleum/solid floor cover	–	37%	47%	–	45%
Vibration dampening cloth	–	–	53%	41%	43%
Floor tile	–	47%	33%	70%	37%
Transite	29%	–	28%	9%	19%
Ceiling tile	–	52%	54%	67%	54%
Other miscellaneous	–	45%	42%	18%	40%
All suspect materials	14%	49%	44%	29%	44%

– The sample size for this combination of area and material was too small for reliable estimation.
Note: This table excludes materials not identified in the AHERA inspection.

Table 3-5. Estimated percent of areas with ACBM present, but not recorded in original AHERA inspection, by area type and material type

Type of ACBM	Type of area				All areas
	Exterior	Limited student access	General access	Mechanical	
All thermal system insulation	–	42%	49%	26%	*40%*
Breeching	–	–	–	10%	*11%*
Boiler	–	–	–	0%	*0%*
Pipe	–	32%	50%	21%	*37%*
Tank	–	–	–	7%	*7%*
Ducts	–	–	–	30%	*47%*
Elbow/fitting/valve	–	47%	100%	33%	*44%*
Other TSI	–	–	–	44%	*52%*
All surfacing	–	32%	18%	23%	*20%*
Ceiling material	–	32%	18%	20%	*20%*
Fireproofing	–	–	69%	25%	*42%*
Wall coating, other	–	–	–	–	*0%*
All miscellaneous	8%	48%	38%	45%	*40%*
Acoustical wall tile	–	–	23%	–	*20%*
Fire doors	–	70%	72%	47%	*60%*
Linoleum/solid floor cover	–	39%	25%	–	*30%*
Vibration dampening cloth	–	–	55%	49%	*47%*
Floor tile	–	46%	32%	64%	*36%*
Transite	8%	–	28%	10%	*19%*
Ceiling tile	–	67%	67%	100%	*67%*
Other miscellaneous	–	44%	41%	10%	*38%*
All ACBM	*9%*	*47%*	*39%*	*28%*	*40%*

– The sample size for this combination of area and material was too small for reliable estimation.
Note: This table excludes materials not identified in the AHERA inspection.

Area types are discussed and specifically listed in Chapter 2, but are summarized here for convenience:

- Exterior areas - porticos, covered walkways, rooftop HVAC units (no walls), etc.
- Mechanical areas - boiler rooms, elevator shafts, mechanical rooms, air and duct shafts, telephone and electrical closets, etc.
- Limited student access areas - janitors' closets, kitchens, offices, supply rooms, teachers' lounges, etc.
- General access areas - classrooms, gymnasiums, auditoriums, cafeterias, restrooms, hallways, etc.

The term **recorded area** is used in this analysis to mean any area within a building in which a particular material was present at the reinspection that was also recorded in that area by the original AHERA inspection. Conversely, an "unrecorded area" is one in which material was found during the reinspection which was not recorded, in any manner, in the original AHERA inspection. It is not possible to differentiate among areas where the original AHERA inspector did not look, areas where the inspector did look but did not find the material, and areas where the inspector merely failed to document as containing the material, thus, the use of **unrecorded**.

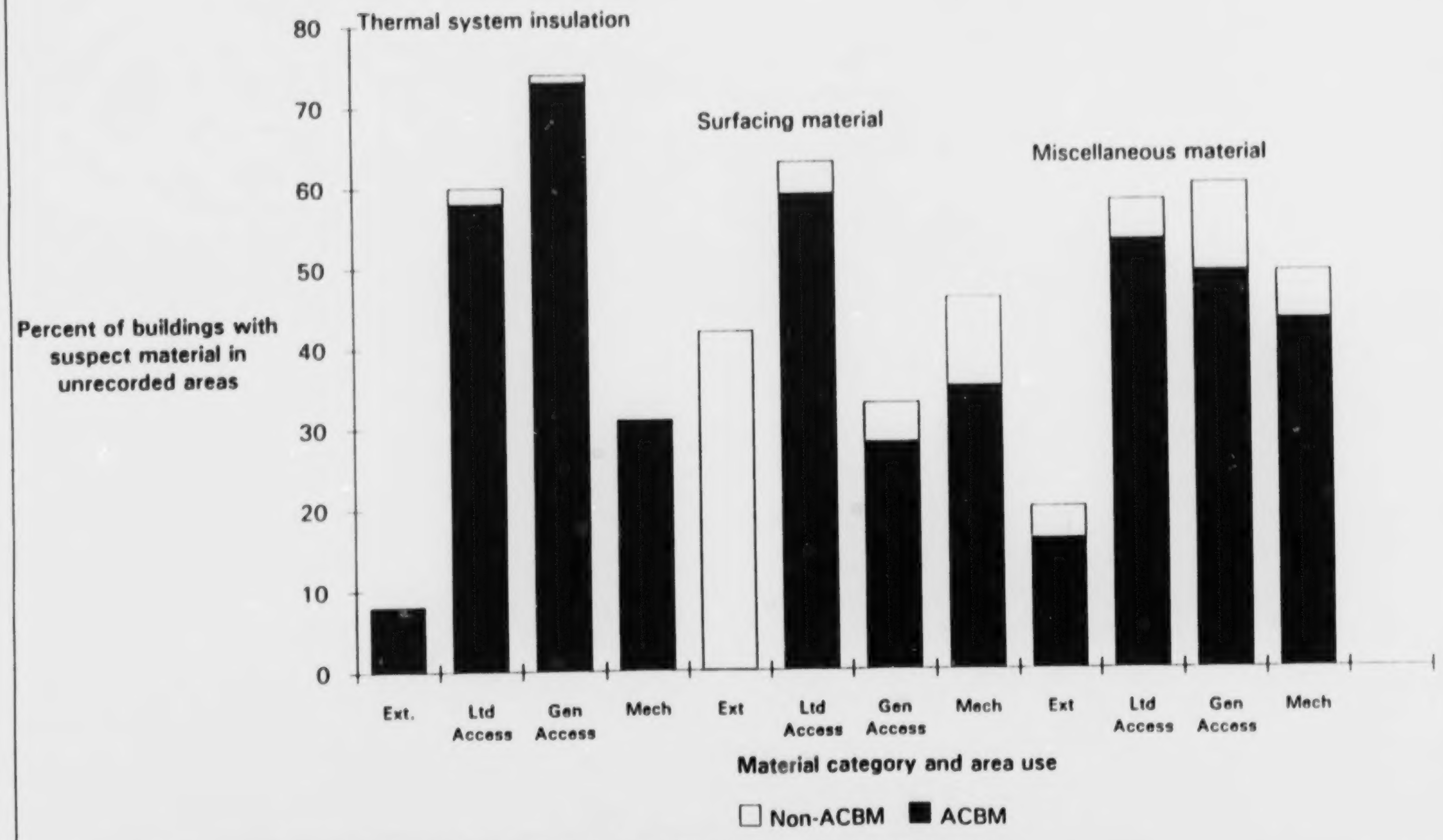
As with the quantity of material underestimated, some discussion is needed regarding how the count of unrecorded areas was performed. We recognized that many factors could contribute to some areas being labelled as unrecorded during the review process. These factors include differences in floorplans or naming building areas and, to a lesser extent, renovations in the school buildings since the original inspection. As with the determination of underestimated quantities, the study team and expert consultants judged that an error of 20 percent was reasonable, given the possible discrepancies. Thus, the percent of unrecorded areas in a building was calculated by taking the difference between 80 percent of the total number of areas recorded by the reinspection (for a given material) and the total number of areas reported by the original AHERA inspection, and then converting to percent of the total number. If the number of areas recorded by the original inspection was greater than 80 percent of the number recorded by the reinspection, the number of unrecorded areas was defined as zero.

To illustrate the interpretation of Tables 3-4 and 3-5, the "All miscellaneous" row in Table 3-4 shows: 13 percent of exterior areas where miscellaneous suspect materials was present were not recorded in the original AHERA inspection, 50 percent of limited student access areas where miscellaneous suspect material was present were not recorded in the original AHERA inspection, and so forth. A number of findings emerge from a careful review of these tables:

- Overall, approximately 44 percent (± 7%) of all areas where suspect material was present was unrecorded. This reflects a tendency among inspection reports to either not indicate areas where materials are present or to do so in an incomplete manner.
- Overall, areas in which ACBM was present were recorded in approximately the same proportion as areas in which any suspect material was present.
- When boiler insulation was identified, its location was universally recorded by all inspectors. Likewise, the location of tank insulation was almost always recorded.
- TSI was significantly more likely to be recorded in mechanical areas than in non-mechanical areas. It was recorded in 74 percent (± 10%) of mechanical areas; in 48 percent (± 10%) of general access areas; and in 57 percent (± 7%) of limited student access areas.
- The locations of asbestos-containing surfacing materials were recorded more often than for suspect surfacing materials. However, none of the differences were statistically significant.
- Locations of fire doors were more frequently unrecorded than locations of any other material (66%).
- There were no patterns of differences in locating material between areas with limited student access and general access areas.

Figure 3-5 provides estimates of the percent of school buildings, of an estimated 189,022 school buildings in the study population, in which the AHERA inspector failed to record more than 80 percent of the areas with suspect materials, by material type and area type. The first bar on the left shows that 8 percent of buildings have suspect TSI (all of which is ACBM) unrecorded in exterior areas. The second bar shows that 60 percent of buildings have suspect TSI

Figure 3-5 Percent of buildings with areas containing suspect materials present, but not recorded in original AHERA inspection, by material category, asbestos content, and area use



Note: "Not recorded" means the material is not recorded in at least 20 percent of areas with the material.

in limited access areas, while 58 percent of buildings have asbestos-containing TSI unrecorded in limited access areas. Significant findings from Figure 3-5 are:

- More buildings have unrecorded materials (over 50 percent of buildings for each material category) in limited and general access areas than in exterior or mechanical areas.
- The percent of buildings with unrecorded areas does not vary significantly with asbestos content of the materials in those areas. This suggests that the original AHERA inspectors did not give greater attention to locating ACBM than to locating other suspect materials.

3.2 Assessment of ACBM Found at Original AHERA Inspection

The second research question addressed in Research Area 1 asks, "Was the asbestos found at the original AHERA inspection properly assessed?". This component of the AHERA evaluation checks the internal consistency of the Management Plan's logic and whether it complies with AHERA's assessment classification of materials. No comparisons were made between the AHERA categories reported in the Management Plans and the categories observed in the reinspection. Such comparisons would not be valid because there were numerous opportunities for changes in the assessment category in the year or two between the inspections. Materials may have been repaired or removed or, conversely, they may have suffered further damage or deterioration.

The first part of the analysis of this research question considers how often asbestos-containing materials were assessed appropriately in the original AHERA inspection. Table 3-6 displays percentages of the number of ACBMs assessed and number assessed appropriately. These numbers are then juxtaposed to the total number of materials which were required to be assessed plus those nonfriable materials which were assessed. Assessment refers to ability of the inspector to consider factors which may contribute to the increase in release of fibers from a material. An appropriate assessment in this table indicates that, at a minimum, the condition of a material or amount of damage to TSI and other friable materials was indicated. An inappropriate assessment was one in which a rating of damage was not included. AHERA regulations do not require nonfriable materials to be assessed, though this was occasionally done in the Management

Plans reviewed. Assessed nonfriable materials were included in the count of total number of materials assessed and were counted as appropriately assessed.

Table 3-6 shows that 92 percent of the ACBM which should have been assessed according to AHERA was indeed assessed. In addition, all of the materials assessed were assessed appropriately, i.e., material condition was always used in the assessment.

Table 3-6. Percent of ACBM in school buildings assessed appropriately in the original AHERA inspection

Total Number of ACBM*	Percent ACBM assessed	Percent ACBM appropriately assessed
653	92%	92%

* Some inspections provided assessments for nonfriable materials. These are included in the total number of materials assessed. Unweighted numbers are presented here.

The second part of the analysis addresses how often the AHERA assessment categories were employed in the original AHERA inspection and how often they were appropriately assigned. In Table 3-7, the assessment must be one of the seven categories defined by AHERA, using either the numbers 1 through 7 or the wording corresponding to those numbers. An appropriate assessment in Table 3-7 means the original AHERA inspector assigned the AHERA 1 through 7 category number or wording correctly, based on material category (TSI, surfacing, miscellaneous), and reported the amount of damage at the original inspection and the potential for damage. If nonfriable materials were assigned an AHERA category, they were counted as appropriately assessed. Since some original AHERA inspectors assessed nonfriable materials even though it was not required, those inspections were not penalized if the AHERA categories were not employed. This explains the difference in the total number of ACBMs in Tables 3-6 and 3-7.

Table 3-7 shows that only 44 percent of original AHERA inspections used the AHERA categories. Of those inspections which used the categories, 93 percent (41% of 44% using the categories) applied them appropriately.

Table 3-7. Percent of ACBM in school buildings assessed appropriately in accordance with AHERA in the original AHERA inspection

Total Number of ACBM*	Percent ACBM assessed using AHERA 1-7	Percent ACBM appropriately assessed using AHERA 1-7
568	44%	41%

* Some inspections provided assessments for nonfriable materials. If AHERA 1-7 was not used for nonfriable materials, those materials have not been included here. Unweighted numbers are presented here.

3.3 Summary

The purpose of Research Area 1 was to estimate how much of the suspect material was found in the AHERA inspections and how much of the ACBM was assessed in conformance with AHERA regulations. "How much" was measured in three ways: we estimated how many materials were identified; to what extent the quantities of identified materials were underestimated, and what percentage of the areas with each type of suspect material the inspection recorded.

An estimated 70 percent of the materials present were identified in original AHERA inspections. TSI was more likely to be identified than either miscellaneous or surfacing materials. When the numbers of the individual suspect materials identified were translated into quantities, approximately 90 percent of the quantity of material present was identified. Materials which were highly likely to be identified accounted for most of the quantity of material, e.g., floor tile, pipe insulation, and boiler insulation. Conversely, materials which were infrequently identified tended to be small quantity materials such as vibration dampening cloth, fire doors, duct insulation, and linoleum flooring. Despite the relatively high percentage of materials identified and material quantities reported, many buildings had at least one material unidentified. It is noteworthy that an estimated 36 percent of surfacing material was unidentified.

Once a suspect material was identified, original AHERA inspectors estimated the quantity correctly in over 50 percent of buildings, and they estimated the quantity of each ACBM correctly in over 60 percent of buildings. The overall quantity of material underestimated ranged from 9 percent (for linear TSI) to 55 percent (for friable miscellaneous ACBM).

Once a material was identified, original AHERA inspectors recorded its location in approximately 60 percent of the areas where the material was present. The location of boiler insulation was universally recorded. In fact, TSI in mechanical areas was recorded more often than in limited and general access areas.

With regards to assessment of ACBM, original AHERA inspectors assessed almost all materials, and did so appropriately. Less than half of these inspectors utilized the AHERA 1-7 assessment categories, but those who used them generally applied them appropriately.

In conclusion, a few material types are commonly unidentified by original AHERA inspectors. Measurements of materials are commonly lower than 20 percent of actual values. Numerous areas with materials present are not clearly recorded as such.

4. MANAGEMENT PLAN EVALUATION

Research Area 2 seeks to evaluate Management Plans nationwide. A plan to determine the completeness and usability of Management Plans was created by Westat and the technical consultants used by this evaluation. This plan was then implemented by two senior Certified Industrial Hygienists.

The question to be answered in Research Area 2 is, "Do schools know and understand the regulation, as shown by the completeness of the Management Plan?". Certified Industrial Hygienist review of Management Plans for completeness was used to collect data to answer this question. Form M1, the Management Plan Checklist, was used for this effort. This form is presented in Appendix A.

Form M1 was based on the EPA's Key Elements Checklist, attached as Appendix E, and was developed to standardize evaluation of the Management Plans collected for each school in the study. Two evaluation criteria were incorporated into the study checklist: completeness and usability. Two other evaluation criteria, correctness and up-to-dateness, were considered but rejected. Correctness was rejected, as the time that had elapsed between the original AHERA inspection and our reinspection made it impractical to use. Up-to-dateness was difficult to judge because schools were responsible for photocopying their own Management Plans and often chose not to photocopy "inessential" elements to save time and money. Completeness and usability criteria and associated findings are discussed in the following sections.

4.1 Completeness of Management Plans

The completeness of each Management Plan was determined through a series of questions based primarily on the EPA's Key Elements Checklist, with some minor changes. The questions addressing completeness were grouped into sections similar to EPA's Checklist as follows:

- **General Inventory** - Form M1 divided EPA's general inventory question into three questions addressing: the presence of an inventory; inclusion of the name and address of each building at a school; and whether each building was identified as containing friable or nonfriable ACBM, assumed ACBM or no ACBM (10 points).

- **Exclusion/Inspection Information** - Form M1 merged the EPA Checklist questions about exclusions and inspections into a single section. This was done because much of the information was substantially the same in these two sections of the EPA Checklist and to equalize scoring among Management Plans, some of which would contain this information, and some of which would not. The study found that most inspections were entirely repeated for purposes of AHERA. The results of previous inspections were used for general information only. The exclusion for buildings built after October 12, 1988 did not apply to this study as this type of building was not included in the evaluation. Descriptions of response actions taken prior to December 14, 1987 were not evaluated. A final question was asked in Form M1, to determine whether the method used to determine the sampling location of each bulk sample was provided (70 points).

- **Response Action Recommendations** - Form M1 merged the EPA Checklist questions for response action recommendations and response actions into a single section. It did not collect data on the reasons for selecting each response action or preventive measure, as analysis of this information was not planned (30 points).

- **Activity Plans** - Form M1 merged the EPA Checklist questions for activity plans and notifications into a single section. The only differences between the two Checklists were that the study included initial cleaning recommendations as a required element and did not differentiate between written steps for notification and the actual notifications (39 points).

- **Resource Evaluation** - Form M1 expanded the EPA Checklist question about the presence of a resource evaluation to include a question asking whether all recommended activities were included in that resource evaluation (10 points).

- **AHERA Designated Person** - Form M1 merged the EPA Checklist questions for the designated person and designated person sign-off. The optional Management Planner sign-off was not addressed by this study (6 points).

The EPA Checklist items "Assurance of Accreditation" and "ACBM Remaining after Response Action" were not addressed by this evaluation. The first was optional, and the expert technical consultants on the evaluation found the latter to be subject to such a wide range of interpretations as to be difficult to grade uniformly.

Form M1 also differs from the EPA's Checklist in that points were assigned to the various completeness answers. The specific point values were determined based on the expert judgment of Dale Keyes, Bill Ewing, and Steve Hays, consultants who worked closely with Westat in the development and finalization of this form. The goal of awarding points for various answers was to establish a reasonable method of comparing Management Plans from different schools. This goal was made more difficult because some Plans relied on previous inspections or other methods to allow them to exclude otherwise required information from their original AHERA inspection report. A Management Plan following this aspect of AHERA should not be penalized. Similarly, Plans that do not contain exclusion or previous inspection information should not be viewed as incomplete for not availing themselves of this element of AHERA. The prevalence of Plans with "Not Applicable" scores to specific questions is shown in Appendix D. The overall scoring algorithm handles "Not Applicable" codes not by penalizing but by crediting the actual score and maximum point potential.

To resolve concerns about differing maximum possible scores, we compared each overall completeness score with the theoretical maximum for a Plan that contained and excluded the same AHERA-allowed elements. All scores were then normalized to a 1-100 scoring system for ease of comparison.

An example of the scoring process follows. First, school Z earned 118 out of a school maximum of 154 points. (Eleven points were not applicable to this school's Management Plan.) This score was then normalized by dividing 154 into 118, for a normalized score of 76. This was then rounded to the nearest number divisible by 10. In this case, it was then rounded up to 80.

Table 4-1 shows the actual normalized scores for Management Plans in this study. The second column in this table presents the overall scores, while each additional column presents the range of scores for the subsections within the completeness scoring plan. This table shows that completeness scores were generally high [80% (± 6%) were 75 or above], as should be expected given the itemized requirements of AHERA combined with the State reviews that have occurred since the initial plan submittals.[1] Notable, however, is the fact that over five (± 4%) percent of the Plans, even with detailed AHERA guidelines and State reviews, received an overall normalized score of 64 or below, grossly incomplete by almost any definition. In both the relatively complete and relatively incomplete Management Plans, points were most commonly lost for items which were not clearly defined in AHERA, or where State-required AHERA forms and checklists failed to prompt for the specific information item. Figure 4-1 shows graphically the distribution of overall scores.

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[1] Another factor contributing to the high "completeness" scores was the screening procedure used for sample determination. Prior to inclusion in the sample, ADPs were asked if the school had a Management Plan.

Table 4-1. Percent of Management Plans awarded various normalized scores for completeness points for Form M1

	Percent of Management Plans awarded points						
		Subsection					
Percent of points	Overall	General Inventory	Exclusion/ Inspection Information	Response action re-commendation	Activity plans	Resource evaluation	ADP
95-100	1%	72%	3%	44%	11%	52%	58%
85-94	41%	11%	23%	16%	40%	x[1]	x
75-84	37%	2%	33%	20%	25%	25%	23%
65-74	15%	11%	25%	3%	10%	x	10%
55-64	3%	1%	11%	1%	3%	16%	x
45-54	< 1%	< 1%	4%	1%	2%	1%	4%
35-44	2%	x	x	x	3%	x	x
25-34	x	x	x	x	< 1%	x	2%
16-24	x	x	x	x	2%	x	x
6-15	x	x	x	x	x	x	x
0-5	x	2%	x	15%	3%	6%	3%
Total	100%	100%	100%	100%	100%	100%	100%
Average per-cent awarded	*81%*	*92%*	*77%*	*77%*	*79%*	*82%*	*86%*
Percent of overall points in this subsection	*NA*	*6%*	*41%*	*18%*	*24%*	*6%*	*4%*

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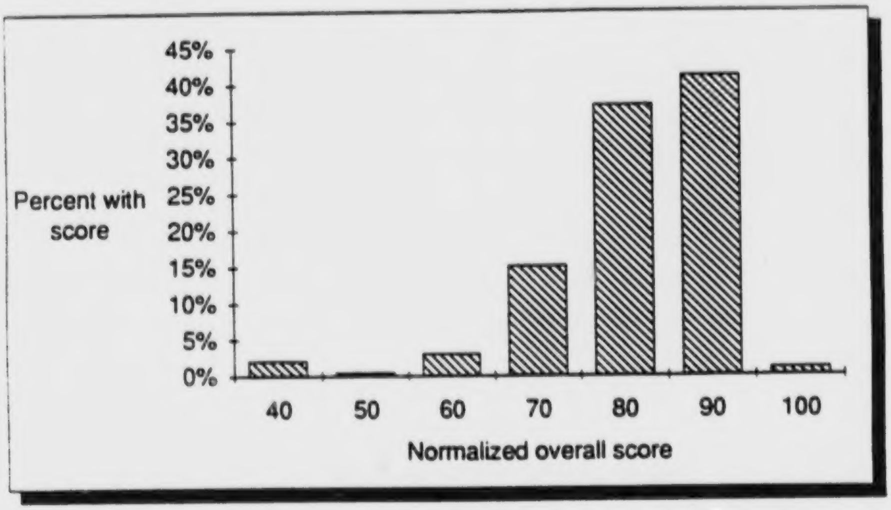
[1] X me[illegible]score[illegible]his it[illegible]his ra[illegible]

114

Figure 4-1. Normalized overall completeness scores for Management Plans



The average total overall normalized completeness score was 81 points (± 2%). As previously mentioned, the completeness portion of Form M1 was divided into six subsections. Each of these subsections is discussed on the following pages.

General Inventory

A total of 10 points could be awarded in the General Inventory subsection of Form M1. The General Inventory subsection addressed the presence of an inventory; the inclusion of the name and address of each building at a school; and whether each building was identified as containing friable or nonfriable ACBM, assumed ACBM, or no ACBM. Appendix D, Management Plan Completeness Item Results, shows the percent of Plans that were awarded each point score for all questions on Form M1, including those in the General Inventory subsection. The problem most frequently found was that Management Plans did not indicate which school building contained friable ACBM, nonfriable ACBM, assumed ACBM, or no ACBM.

Table 4-1 (page 4-4) shows the normalized scores for answers to questions in the General Inventory subsection of Form M1. This table shows that, at 92 percent (± 4%), the average percent complete of the General Inventory subsection was significantly above that for the normalized average percent of points.

Exclusion/Inspection Information

The Exclusion/Inspection Information subsection of Form M1 contained a maximum total of 70 points and was the single most important area for completeness on the form. This subsection asked about the presence of exclusion/inspection information, including locations and quantity of homogeneous materials, method of bulk sample collection, and analysis. Table 4-1 shows the percent of Plans awarded various points for each score.

All Management Plans contained some information on exclusions and/or inspections, and a large majority of Plans received the maximum points for many specific questions on Form M1. For instance, 79 percent (± 6%) of Management Plans contained all required assessments, although some Plans treated undamaged TSI as nonfriable and, thus, did not assess them. (Positively, many Management Plans assessed all materials regardless of friability, but this information was not captured in Form M1.)

Focusing now on the specific questions in the Exclusion/Inspection Information section where fewer than 70 percent of Management Plans received the maximum point score, the following incomplete areas emerged.

Locations of homogeneous areas. Only 58 percent (± 9%) of Management Plans showed the locations of all of the homogeneous areas in the building. These locations were commonly not clearly described, especially where a material was present in numerous locations within a building. Only 52 percent (± 13%) of Plans showed the approximate square or linear footage of all homogeneous areas.

Identification of material type. Fifty-five percent (± 11%) of Plans did not categorize homogeneous materials as TSI, surfacing material, or miscellaneous material in all areas. Many did, however, identify materials using more conversational or descriptive terms such as VAT, or breeching.

Bulk sample locations. Seventy-six percent (± 8%) of Plans did not describe the method of bulk sample location determination for any area in the school. Moreover, only 18 percent (± 6%) of Management Plans presented this information for all sampling locations. Although most Plans contained a textual description of how bulk sample locations were supposed to be selected, few showed how those procedures were applied to a specific material.

TSI and bulk samples. Sixty-seven percent (± 10%) of Plans described using a method of determining sample locations fully or substantially in accordance with AHERA for TSI. Performance on surfacing materials was worse at 42 percent (± 8%). These numbers may not reflect actual field practices, however, as many Management Plans simply do not describe the method of sampling used.

Date of analysis of bulk samples. Thirty-one percent (± 11%) of Plans presented all bulk sample results without a date of analysis.

Assessor of ACBM. Sixty-eight percent (± 8%) of Plans contained a signature of the assessor of friable ACBM, and only 51 percent (± 10%) showed the date of such a signature. In both cases, 15 percent (± 4%) of Plans were ineligible to respond to these questions.

Some other general weakness discovered by our reviewers include the following:

- Inspector signature and date were frequently missing from both sampling and assessment records. This was primarily a result of using standardized field forms which do not ask for these items. In the case of teams, this lack of prompts made it impossible to determine which person collected a sample and which person made a material assessment.
- When previous inspection results were used in the original AHERA inspection, the AHERA requirements were not usually met, e.g., materials were not given homogeneous area identities, or bulk sampling information was not shown to meet AHERA requirements.
- Materials for which bulk sampling analyses were negative for asbestos were frequently not treated fully as homogeneous areas, e.g., they were not quantified and locations were not specified.
- Some laboratories indicated a laboratory identification number on their report with no reference to the National Institute of Science and Technology's National Voluntary Laboratory Accreditation Program (NVLAP) or documentation of NVLAP accreditation.

Table 4-1 (page 4-4) shows the range of percent of points awarded for the Exclusion/Inspection Information subsection of Form M1. The scores awarded for this subsection are remarkably similar to those awarded as overall scores. The average percent of points awarded in the Exclusion/Inspection Information subsection was 77 percent (± 3%).

Response Action Recommendations

The Response Action Recommendation subsection of Form M1 has a maximum of 30 pre-normalization points. Response action recommendations were almost always made for friable materials determined to be ACBM.

Over 80 percent (± 4%) of Management Plans contained some written recommendations to the LEA for responding to all friable ACBM and all TSI. Given that 13 percent (± 3%) of Plans' answers to this question were not applicable, this is a particularly encouraging finding. In other words, 91 percent of the Plans which should have had this information did so. Twenty-six percent (± 8%) of recommendations to LEAs for response actions had no date. This was an omission.

Only 54 percent (± 10%) of recommended response actions contained a recommended schedule for beginning and ending all response actions. Incompleteness of this type could lose a Management Plan as many as five pre-normalized points. Some Management Plan preparers put the burden of specifying schedules on the LEA, though the Management Plan is required by AHERA to contain a schedule.

The large number of Plans scoring 80 percent (± 6%) or better for the Response Action Recommendation subsection (shown in Table 4-1, page 4-4) reflects the relatively complete performance of Management Plans like those included in the study. By contrast, 15 percent (± 4%) of Plans were awarded no points for this subsection. The average percent of possible points awarded for this subsection was 77 present (± 4%).

Activity Plans

A total of 36 pre-normalization points maximum could be awarded in the Activity Plan subsection of Form M1. This made it the second most heavily weighted subsection. Required activity plans were generally present in Management Plans but were generally standardized inserts that were not specific to the school or building.

Specific areas of the Management Plans that were weak include:

Initial and additional cleaning. Only 58 percent (± 8%) of Management Planners noted AHERA-required initial cleaning and discussed whether additional cleaning was recommended. This occurred despite the fact that credit was given if this cleaning was discussed in the O&M Plan. LEA written response to the cleaning recommendations was frequently missing, or there was no signature.

Notification. Thirty-one percent (± 10%) of Management Plans did not describe the steps by which workers and building occupants were notified about post-response action activities such as periodic surveillance and reinspections.

With regard to notification, a very generous scoring methodology was used for this area. Even if a Management Plan contained no reference to notification, full points were awarded if a copy of an actual notification or sample notification was included in the Management Plan delivered to Westat. Using this definition of "presence of a notification", most Management Plans contained steps (or actual notifications) for announcing availability of the Management Plan. Points were lost if the notification plan did not contain provisions for identifying response actions, inspections/reinspections, and post-response actions. Some experts argue that notification of Management Plan availability satisfies the latter requirement.

Table 4-1 (page 4-4) presents the normalized scores for the Activity Plans subsection. The average score was 79 percent (± 5%), though 11 percent (± 6%) of Management Plans were awarded 50 percent or fewer of the points possible for this subsection.

Resource Evaluation

A maximum of 10 non-normalized points could be awarded for the Resource Evaluation subsection. Resource evaluation was interpreted in two distinct ways. One was the itemization costs associated with recommended asbestos activities over a given time period. The other involved statements about the school's plans for funding the specified asbestos activities. Both were accepted in the scheme of the checklist scoring. Only six percent (± 6%) of Plans did not contain some evaluation of resources needed to carry out ongoing asbestos-related activities in the school.

Forty-two percent (± 12%) of Management Plans did not take all recommended response actions into account when performing the resource evaluation. Points were deducted if even a few activities were not considered in this process. For example, removal costs were commonly given with no itemized O&M or reinspection costs.

Table 4-1 (page 4-4) presents the percent of Management Plans awarded various percents of maximum points for this subsection. The average score was 82 percent (± 7%).

AHERA Designated Person (ADP)

The ADP subsection of Form M1 studies Management Plan completeness with regard to the AHERA designated person. The maximum number of non-normalized points for this subsection was six.

Most Management Plans listed the pertinent information required for the AHERA designated person. In 21 percent (± 8%) of Plans, training received by the ADP was omitted, and in 28 percent (± 10%) of Plans someone other than the ADP signed off that LEA responsibilities under AHERA had been met. The lack of training information may reflect a lack of training or merely a deficiency in reporting.

Table 4-1 (page 4-4) shows the percent of points awarded for the ADP subsection of Form M1. Only 19 percent (± 9%) of Management Plans received less than 80 percent of the points possible for this subsection. The average score was 86 percent (± 5%).

4.2 Usability of Management Plans

The second evaluation criterion was usability of the Management Plan. By usability, we mean factors which ease use of Management Plans as reference manuals and planning documents. The EPA does not address usability in its Checklist, but acknowledges that the large amount of information required in a Plan can be confusing to the lay person.

Westat developed the concept of usability to assess factors which make information in a Management Plan easier or more difficult for the reader to understand. These factors include whether materials can be tracked through the Management Plan; document formatting such as numbered pages, summaries, table of contents, definitions and floor plans, and correct and consistent use of AHERA terms such as homogeneous area, functional space, random sampling, and exclusion. This form also evaluated usability by analyzing what groups of people (based on characteristics of education level, knowledge of building, and asbestos survey experience) would be able to understand and use the Management Plan.

The first aspect of the effort to determine Management Plan usability analyzed specific features that would ease use of a Management Plan. Table 4-2 presents the results of this portion of the usability analysis.

Table 4-2. Percent of Management Plans containing various features that increase usability*

Usability features	Yes	No
1. Basic Table of Contents	77%	23%
2. Detailed Table of Contents	36%	64%
3. Headings for Table of Contents used consistently in text	74%	26%
4. Numbered pages	62%	38%
5. Contains definitions section	36%	64%
6. Narrative that describes sections	46%	54%
7. Asbestos Control Program Organization Chart	10%	90%
8. Diagrams or floorplans showing sampling locations, homogeneous areas, or ACM	59%	41%
9. Other items - includes lists of abbreviations, tabbed section dividers, etc.	40%	60%
		N = 83,840

*Respondents may have listed more than one feature; therefore row totals add to more than 100%.

None of these elements is required by AHERA. However, all, with exception of the Program Organization Chart and diagrams or floorplans, are standard organizational and presentational techniques used by report writers to facilitate use of a document. Yet many Plans missed the following elements: 23 percent (± 13%) missed the basic Table of Contents, and 64 percent (± 10%) missed the detailed Table of Contents and definition section.

Table 4-3 shows the percent of Management Plans that contained various combinations of the first seven elements listed above. This table shows that none of the Management Plans utilized all seven elements and that 24 percent (± 13%) utilized only one or none of these presentational techniques.

Table 4-3. Percent of Management Plans containing various usability elements

Number of usability elements	Percent
No elements	7%
1 element	17%
2 elements	10%
3 elements	12%
4 elements	19%
5 elements	20%
6 elements	15%
7 elements	0%
	N = 83,840

Other interesting insights into the usability of Management Plans are provided by Table 4-4. This table shows the rate of occurrence of various features that detracted from the usefulness of Management Plans. As this table shows, that although each feature occurred relatively infrequently, 69 percent (± 9%) of Plans overall had one or more features that detracted from their ease of use. Other detracting factors include an unclear inspection report and not assessing ACBM using AHERA categories.

Table 4-4. Percent of Management Plans which included features that decrease usability

Features that decrease usability	Yes	No
Standard forms such as State forms are used but not explained	16%	84%
Problem with presentation of homogeneous area information, (i.e., areas not numbered, or inconsistent descriptions)	13%	87%
Floorplans are poor or lack keys	5%	95%
Computerized data not explained	5%	95%
Other problems	31%	69%
	N = 83,840	

A second important element in Management Plan usefulness is the consistent and clear use of AHERA-defined terms such as "homogeneous area" and "functional space." Table 4-5 presents the percent of Management Plans like those studied using various terms correctly.

Table 4-5. Percent of Management Plans using AHERA-defined terms correctly

AHERA-defined terms	Yes	No	N
Homogeneous area	87%	13%	83,840
Functional space	44%	56%	74,301 [1]
Exclusion	81%	19%	31,021 [1]
Random sampling	82%	18%	74,055 [1]

[1] Some Management Plans did not use this element as it was not applicable. For example, Plans with no friable ACBM would not require the use of the term "functional space," and Plans for which complete inspections were performed under AHERA would not require the use of the term "exclusion."

While only 13 percent (± 6%) of Management Plans used the term "homogeneous area" incorrectly, 56 percent (± 9%) used the term "functional space" incorrectly. With even one of these two key terms misused, it is hard to imagine that an inspection fulfilled the requirements of an AHERA inspection as each of these terms is essential to the AHERA inspection process. AHERA requires that material be sampled on the basis of its homogeneous area, while it is assessed within its functional space. The concepts of exclusions and random sampling are also important elements in AHERA, and yet 19 and 18 percent, respectively, of Management Plans used these terms incorrectly.

Table 4-6 presents the percent of schools which defined a specific number of terms correctly. This table also includes all "Not Applicable" responses as correctly defined terms. A "Not Applicable" response may have been used if a school relied on earlier inspection results or if, for example, no suspect material was found in the school. A total of 37 percent (± 9%) of schools defined all four terms, homogeneous area, functional space, exclusion, and random sampling correctly. Only 1 percent (± 2%) of schools defined no terms correctly.

Table 4-6. Percent of schools which defined Management Plan terms correctly

Number of terms defined correctly	Percent of schools
4	37%
3	46%
2	12%
1	4%
None	1%
	N = 83,840

The single most subjective element in our efforts to determine Management Plan usability was in the analysis of the level of education and other components of background required to easily make use of a Management Plan. By ease of use, we mean use without training. Despite the fact that this is a subjective determination, we thought that it was important because of our understanding of the average educational level of maintenance workers and custodians, and because these types of workers are supposed to be able to use Management Plans to determine the locations of ACBM. The findings presented in Table 4-7 are troubling given that maintenance workers, custodians, and parents of all educational levels are three of the primary intended users of Plans. Considering ease of writing style and organization, consistency of presentation, frequency of use of abbreviations, and clarity of definitions, our Management Plan reviewers did make this judgment. Considerable time was spent to ensure between- and within-reviewer consistency. Finally, both reviewers frequently serve as trainers for maintenance workers and custodians and have developed an awareness of the needs and skills of this population.

Table 4-7. Percent of Management Plans usable and understandable without instruction, by persons of various educational attainments

Level of education	Percent of Management Plans
Less than high school diploma	5%
High school diploma	34%
More than high school diploma	39%
Requires instruction to use even with advanced degree	22%
	N = 83,840

This table shows that 39 percent (± 5%) of Management Plans are judged to be appropriately written for persons with some college background, and that an additional 22 percent (± 6%) of Management Plans could only be used by persons who had received instructions in how to use it, no matter what their educational level.

Table 4-8 presents our reviewers' attempts to assess the ease of use of Plans by persons who know the school well. These persons would include custodians and the principal. An additional evaluation was made to determine how easy each Plan would be for persons with AHERA inspection experience who may not have prior knowledge of the school building. Such persons include consultants hired to do remediations and State enforcement personnel.

Table 4-8. Percent of Management Plans judged easily usable without prior instruction, by different types of persons

	Percent of Plans judged usable			
Potential Management Plan users	**By all people**	**By most people**	**By some people**	**By none/few people**
Persons with knowledge of the school building	7%	39%	39%	16%
Persons with AHERA asbestos inspection experience	28%	48%	20%	5%
				N = 83,840

Table 4-8 shows that 16 percent (± 5%) of Plans would currently not be usable, or could be used only by persons knowledgeable about the school building, and 39 percent (± 8%) would be understandable by some of these people. This means that 55 percent (± 7%) of Management Plans would be understandable to less than half of people knowledgeable about the building.

Table 4-8 also presents our experts' judgment about the usability of Management Plans by persons with a background in AHERA inspections. On the whole, these people were assumed to be knowledgeable about asbestos inspections and AHERA terminology and requirements. The table shows, however, that, even for this knowledgeable audience, 5 percent (± 4%) of Plans would be understandable by no to few users. Eighty percent (± 5%) of Plans would be easily understood by half of the people with AHERA inspection experience. In summary, the table shows that a greater percentage of persons with AHERA experience would be able to use Plans than those with knowledge of the building. This suggests that Plans tend to be more deficient in explaining AHERA terms and requirements than in describing buildings, locations, and materials.

4.3 Summary

Management Plans nationwide were evaluated in Research Area 2. Two evaluation criteria were used: completeness and usability. Insights into both areas were found in the evaluation, leading to the conclusion that Management Plans are, on the whole, reasonably complete, but rather disappointingly difficult to use.

The completeness of each Management Plan was generally high, with 80 percent (± 6%) of the Plans receiving a normalized score of 75 or higher. However, 5 percent (± 4%) of Management Plans received an overall normalized score of 50 or below, making it clear that these Plans, even with Federal and State guidelines, were substantially incomplete. Categories of items, based primarily on the EPA's Key Elements Checklist, were analyzed to determine completeness.

The second criterion, usability, was considered important in determining how helpful and easy to use a Plan was and whether or not users could rely on it as a reference. This analysis looked at features which would ease use of a Management Plan, such as Table of Contents, page numbering, and floorplans showing sampling locations, homogeneous areas, or location of ACBM. Also evaluated were various features which decrease usability, such as computerized data not explained, or problems with the presentation of homogeneous area information. Sixty-nine percent of Plans had one or more features that detracted from ease of use. Four highly significant AHERA-defined terms were defined correctly in 37 percent (± 9%) of Management Plans, while three of the four were defined correctly in 46 percent (± 12%).

Finally, we attempted to determine the percentage of Plans usable and understandable by persons of various educational attainments. We found that 39 percent (± 5%) of Plans are written for persons with some college, and that an additional 22 percent (± 6%) could be used only by people who had instructions in use, regardless of educational level.

5. RESPONSE ACTION EVALUATION

The objective of Research Area 3 was to ascertain the types of response actions and remediations conducted by schools and evaluate both their quality and appropriateness. For the AHERA evaluation a remediation is repair, encapsulation, enclosure, or removal of greater than three linear or square feet of ACBM. A response action includes all four remedial actions and Operations and Maintenance (O&M). Three specific research questions were addressed:

- What response actions were recommended in the Management Plans?
- Are the recommended response actions appropriate, given the assessed condition of the asbestos?
- Have the remediations undertaken in the school been done properly?

Data were collected for the first two questions through an evaluation of each sampled school's Management Plan. The third question required analysis of data from the reinspection of the school as well as from the Management Plan.

5.1 Response Actions Recommended in Management Plans

The first research question studied in Research Area 3 is, "What response actions were recommended in the Management Plan?" A comprehensive review of the Management Plans for all response actions recommended for ACBM discovered during the original AHERA inspection provided the data to address this question.

Table 5-1 summarizes the types of response actions for each material in each building recommended in the Management Plans. This is projected from the sample of 197 schools to the national population of schools like those in the survey. It is important to keep in mind that this analysis addresses only **recommended response actions**; the analysis of **remediation actually performed** appears in Section 5.3. The information in this chapter is based on the estimated 83,840 schools nationally that performed an AHERA inspection, found asbestos-containing materials, and wrote a Management Plan. An estimated 302,001 response actions (one per material in each building) were recommended in the Management Plans, the vast majority of which were Operations and Maintenance (55%, ± 7%) or repair of damaged area (33%, ± 8%). Only 10 percent (± 2%) of the recommended response actions involved removal of some or all of the ACBM.

Table 5-1. Estimated numbers and percentages of recommended response actions, by asbestos material category

Recommended response action	Material category						All materials	
	Miscellaneous		Surfacing		TSI*			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Operations & Maintenance	111,996	93%	3,677	38%	50,642	30%	*166,315*	55%
Repair damaged area	2,636	2%	1,183	12%	95,474	56%	*99,293*	33%
Remove damaged area	1,663	1%	1,700	17%	8,634	5%	*11,997*	4%
Remove all material	3,247	3%	2,138	22%	6,467	4%	*11,852*	4%
Encapsulate	635	1%	1,069	11%	2,149	1%	*3,853*	1%
Remove severely damaged asbestos material, repair minor damage	524	<1%	0	0%	5,468	3%	*5,992*	2%
Enclosure	307	<1%	0	0%	2,392	1%	*2,699*	1%
All response actions	*121,008*	*100%*	*9,767*	*100%*	*171,226*	*100%*	*302,001*	*100%*

*TSI = Thermal system insulation.

Note: Percentages may not add exactly to 100%, due to rounding.

The distribution of recommended response actions varied with the type of ACBM. Repair of damaged materials was recommended for 56 percent of the occurrences of TSI. In contrast, operations and maintenance was recommended for miscellaneous materials in 93 percent of recommendations.

Table 5-2 looks at the recommended response actions on a school, rather than a material, basis. To illustrate the information in Table 5-2: The response action "remove damaged area" was recommended for miscellaneous ACBM in 1,053 school buildings, which is one percent of the estimated 166,665 school building with miscellaneous ACBM. Table 5-2 shows the same patterns of percentage as Table 5-1. In particular, removals (partial or complete) were recommended in 11 percent (± 4%) of the 179,093 school buildings with ACBM. One new finding in Table 5-2 is the number of schools with no recommended response action, despite the presence of ACBM. Half of the schools with miscellaneous ACBM have no recommended response action.

Table 5-2. Estimated numbers and percentages of school buildings with different recommended response actions, by asbestos material category

	Material category						All materials	
	Miscellaneous		Surfacing		TSI*			
Recommended response action	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Operations & Maintenance	79,058	47%	3,677	38%	36,621	38%	*92,519*	*52%*
Repair damaged area	2.636	2%	1,183	12%	57.643	60%	*59,834*	*33%*
Remove damaged area	1,053	1%	1,700	18%	5,517	6%	*7,643*	*4%*
Remove all material	2.816	2%	1,728	18%	5,879	6%	*9,458*	*5%*
Encapsulate	635	<1%	1,069	11%	990	1%	*2,156*	*1%*
Remove severely damaged asbestos material, repair minor damage	524	<1%	0	0%	3.844	4%	*4,369*	*2%*
Enclosure	307	<1%	0	0%	2,392	2%	*2,699*	*2%*
None	83.966	50%	830	9%	2.265	2%	*52.811*	*29%*
Buildings with ACBM in category	*166,665*	*100%*	*9,705*	*100%*	*96,396*	*100%*	*179,093*	*100%*

*TSI = Thermal system insulation.

Note: Because two or more different response actions can be recommended in a given school, the numbers and percentages do not add down the columns.

5.2 Appropriateness of Response Actions Recommended

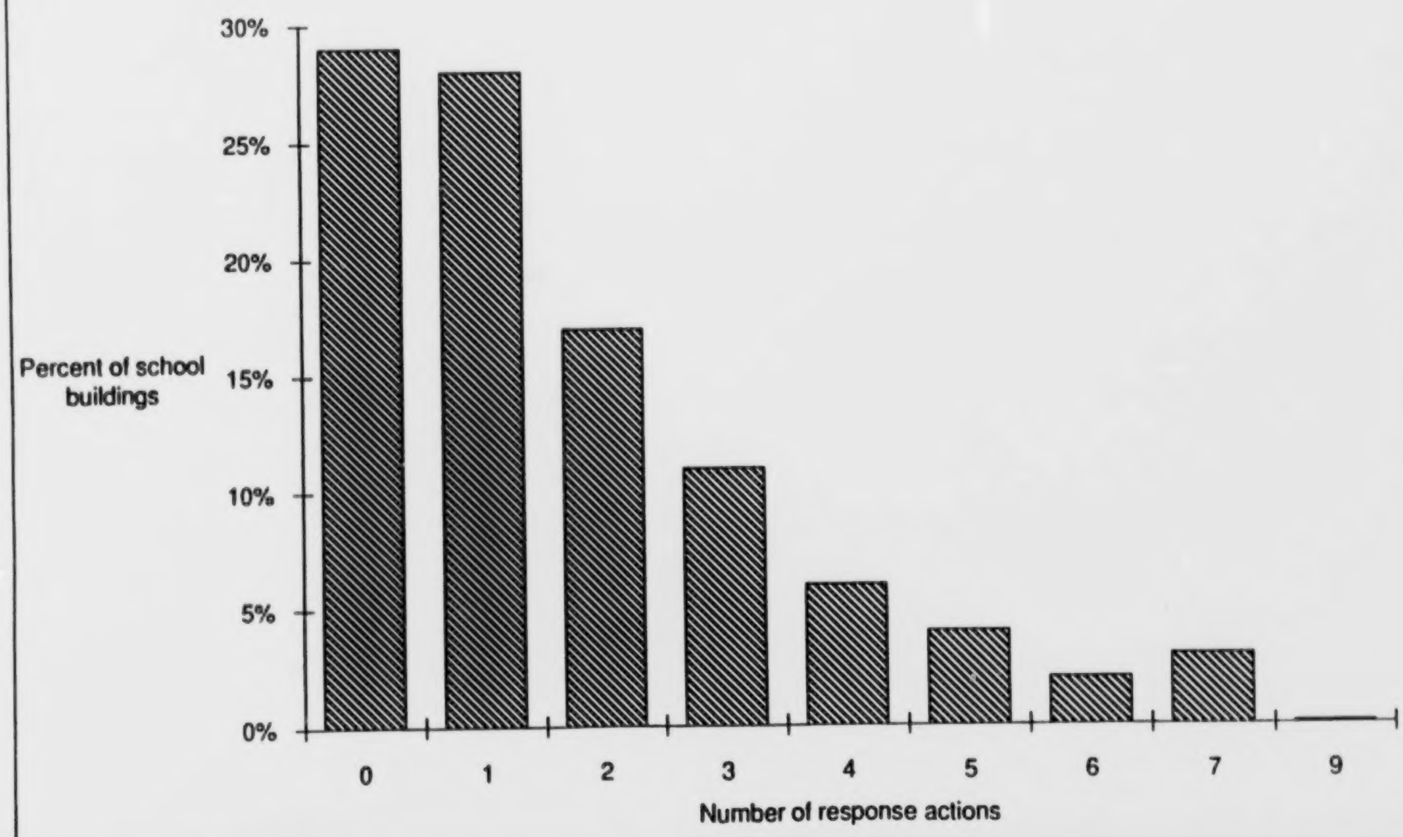
The second research question in Research Area 3 studied whether the recommended response actions "are appropriate, given the assessed condition of the asbestos." Data were collected through review of response actions recommended in the Management Plans as evaluated by expert Management Plan reviewers. A response action was considered appropriate if it was in accordance with AHERA requirements that protect human health and the environment. Examples of appropriate response actions are the recommendations of repair for damaged TSI, encapsulation of a damaged area of acoustical ceiling, and removal of asbestos-containing ceiling tiles. Examples of inappropriate response actions are recommendations of O&M for damaged pipe insulation or significantly damaged floor tile.

In addition to evaluating the appropriateness of the recommended response actions, the Management Plan reviewers also assessed whether or not the response action went beyond the minimum requirements of AHERA and whether the recommended action was generic or specific. Examples of response actions that go beyond AHERA requirements include encapsulation of material in good condition and putting nonfriable material in an operations and maintenance program. Response action recommendations were considered to be specific if specific areas of material or rooms were indicated for repair, removal or careful surveillance. Examples of specific recommendations are "remove damaged acoustical ceiling material in Room 107" or "repair damaged pipe insulation to the left of the boiler." Response actions were considered to be generic if, for example, they recommended removal of all damaged material without indicating the locations of the damaged material. Examples of generic recommendations are "repair damaged pipe elbow insulation" or "enclose or encapsulate damaged ceiling tile." Generic recommendations provided less useful guidance to the subject school than specific recommendations.

Table 5-3 summarizes the findings on a material basis. Nearly all (98%, ± 1%) recommended response actions were appropriate, i.e., in accordance with AHERA. However, only 39 percent (± 5%) of the recommended and appropriate response actions went beyond AHERA. While few (8%, ± 4%) of the response actions for TSI went beyond AHERA, most (83%, ± 6%) of the response actions for miscellaneous materials did so. A large percentage of these were the inclusion of floor tile in an Operations and Maintenance plan. An estimated four-fifths of the recommended response actions were generic, across all three material types.

A similar picture emerges when one looks at the patterns across the materials within a school building. Figure 5-1 displays the distribution of the number of response actions recommended for a school building, among buildings with ACBM. Twenty-nine

Figure 5-1. Estimated number of recommended response actions by school building, among buildings with ACBM



percent (± 18%) of these buildings had no response actions recommended. Another 28 percent (± 9%) had only one recommended action.

Table 5-3. Characteristics of recommended response actions, by asbestos material category

	Material category			All
Response action characteristic	**Miscellaneous**	**Surfacing**	**TSI***	**materials**
Appropriate	117,902 97%	9,768 100%	168,418 98%	296,088 98%
Beyond AHERA (1)	99,939 83%	2,514 26%	14,203 8%	116,656 39%
Specific (2)	15,579 13%	2,122 22%	42,704 25%	60,405 20%
Generic (2)	105,428 87%	7,645 78%	128,446 75%	241,519 80%
Total recommended actions	121,008	9,768	171,523	302,299

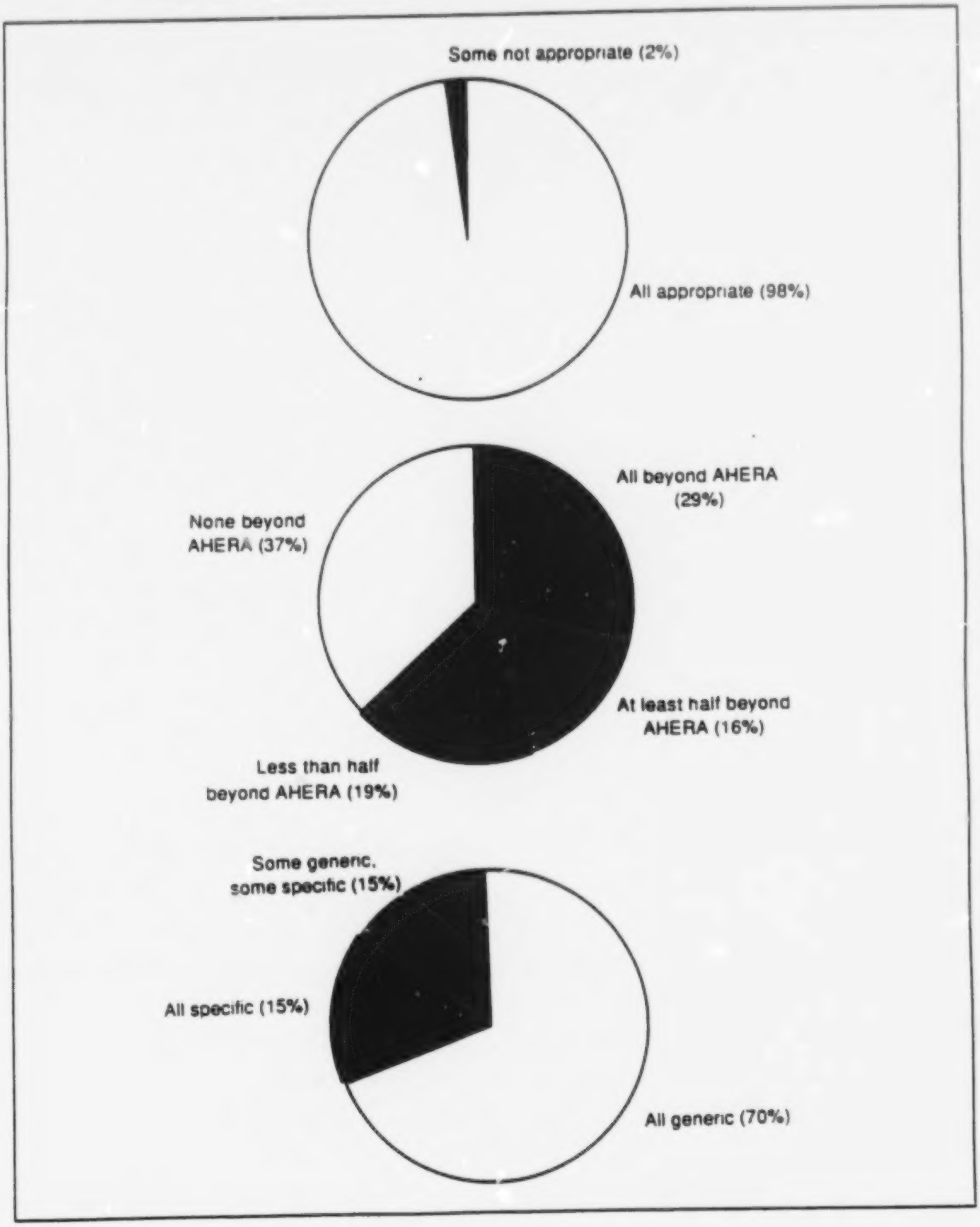
*TSI = Thermal system insulation.

(1) All actions "beyond AHERA" are also appropriate.

(2) All actions are either generic or specific.

Figure 5-2 displays the appropriateness of the response actions within schools. Nearly all are appropriate. The nation's school buildings divide nearly equally into buildings in which all the recommended actions go beyond AHERA (29%, ± 10%), none of the actions do (37%, ± 7%), and some but not all go beyond AHERA (35%, ± 11%). Most Management Plans (70%, ± 9%) contain only generic recommendations for response actions. These findings indicate that Management Planners generally follow the AHERA regulations, but tend not to go beyond the minimal requirements of AHERA. Because going "beyond AHERA" involves both actions which may serve to reduce risk, such as including non-friable materials in an O&M Plan, and actions which have the potential to increase risk, such as recommending the removal of material in good condition, the implication of these findings cannot be addressed.

Figure 5-2. Differences in characteristics of recommended response actions within school buildings (percent of buildings with indicated characteristics)



5.3 Evaluation of Remediations Actually Performed in Schools

The first two research questions dealt with response actions recommended in the Management Plans. The third research question in Research Area 3 is, "Have the remediations undertaken in the school been done properly?" This question was studied during the building reinspection. As each remediation reported or discovered by the reinspector was found, a visual determination of the adequacy of the remediation was performed. We acknowledge that actual, real-time observation of the remediation activity (in particular, containment construction and integrity, worker protection, and asbestos waste disposal) would be the preferred method of evaluating the adequacy of remediation. However, the remediations of concern had occurred up to 2½ years prior to the study reinspection. Thus, no attempt was made to evaluate how a remediation was carried out. In particular, air monitoring and dust samples were not taken. Only the **results** of each remediation were evaluated.

The definition of an adequate remediation varied with the type of remediation action. An enclosure was considered adequate if it appeared visually to be impact resistant and airtight. Otherwise, it was considered inadequate. An encapsulation was considered adequate if the material appeared visually to be laminated and formed a complete barrier. A removal was adequately performed if no residual material was observed; that is, there was no visual evidence of remaining material. Finally, a repair was adequately performed if the material visually appeared both laminated and airtight.

Assessing remediations "after the fact" proved to be particularly challenging for field personnel, for two major reasons. First, there are no industry-wide procedures. The task of visually assessing remediations after the fact is not a routine procedure. Although assessment guidelines were developed for this study, inspectors were required to make judgments in the field with which they had little or no experience. For example, a previous removal activity was to be judged by the inspectors as complete or incomplete even when reinsulation or other replacement material had been applied.

Second, there are few specific industry-wide definitions. Although each type of remediation is broadly defined in various documents, including AHERA documents, many specific remediations may be classified into one or more of these definitions. For example, covering floor tile with plywood sheets may be viewed as an enclosure, or as an encapsulation with glue upon which the plywood has been laid. Various remediations described as "repair" may fall into one or more of the other three remediation categories of removal, encapsulation, or enclosure. In addition, many remediations conducted by schools involved one or more response actions simultaneously, e.g., removal of severely damaged material and repair of material with only minor damage. Although specific actions were classified into one of the four remediation categories for this study, school personnel did not always use those same classifications. Further, during the ADP interviews, many school personnel described remediations applied to materials that were later found to be non-ACBM. For example, ceiling tiles were frequently reported to have been removed during pipe insulation removal. Although the ceiling tiles were most likely properly removed as asbestos-contaminated materials, they were deleted from the list of materials upon which remediation was implemented for this study's analysis.

Reviews of Management Plans and interviews with ADPs resulted in 696 reported remediations in the sample. Of these, 632 could be confirmed by the reinspection personnel.[1] Application of the statistical weights yields an estimated 274,970 remediations performed in school buildings nationwide. Ninety percent or 246,260 remediations, could be confirmed in a reinspection. The findings presented here apply only to confirmed remediations.

Table 5-4 presents the findings on the numbers and adequacy of remediations, by remediation category and material type. Most remediations (92%, ± 7%) were deemed to have been adequately performed, both overall and for most combinations of material type and action categories. There are, however, significant exceptions to this general statement. Only 12 percent (± 12%) of enclosures were considered adequate; no enclosures applied to miscellaneous materials were considered adequate.

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[1] An example of an unconfirmed action is a situation in which a specific repair was reported in a specific area, but the re-inspector could find no evidence of a repair in that room.

Table 5-4. Adequacy of remediation performed, by asbestos material category and remediation category

	Remediation category									
	Enclosure		Encapsulation		Removal		Repair		All remediation	
Material category	Number of actions	Percent adequate	Number of actions	Percent adequate	Number of actions	Percent adequate	Number of actions	Percent adequate	Number of actions	Percent adequate
TSI*	2,823	19%	20,689	92%	140,541	100%	15,949	82%	*180,003*	96%
Surfacing	0	–	7,895	97%	5,792	100%	0	–	*13,687*	98%
Miscellaneous	1,553	0%	489	100%	34,743	77%	721	0%	*37,507*	72%
All materials	*4,376*	*12%*	*29,073*	*94%*	*181,076*	*96%*	*16,670*	*78%*	*231,196*	*92%*

*TSI = Thermal system insulation.

Note: Actions involving less than 3 square feet or 3 linear feet of ACBM are excluded in accordance with AHERA regulations.

Tables 5-5 and 5-6 look at remediations on a building basis, by percent of adequate actions. An estimated 36,970 school buildings (20% of all school buildings with ACBM) had visually confirmable remediation. Further, 28,626 buildings or 16 percent of buildings with ACBM, had removals of some or all of the ACBM. Inadequate remediations were found in only 17 percent of school buildings with remediations.

5.4 Summary

This chapter presents a summary of the findings of the evaluation with respect to response actions (removal, repair, encapsulation, enclosure, and O&M) and the smaller subcategory of remediation (removal, repair, encapsulation, and enclosure). The most common response action recommended in the Management Plans was Operations and Maintenance, followed by repair of damaged material. Eleven percent of the Management Plans recommended removal of some or all of the ACBM. While nearly all recommended response actions were appropriate, only 39 percent went beyond what was required by AHERA. Further, only 20 percent provided specific response action recommendations; 80 percent provided generic recommendations, limiting their utility to the schools.

An estimated 231,000 remediations were performed in over 36,000 school buildings. Ninety-two percent of the remediations were adequately performed, as determined by visual inspections. However, few enclosures were deemed adequate. Removals were performed in 16 percent of school buildings.

Table 5-5. Differences in adequacy of remediation performed in school buildings, by remediation category

Remediation category	Number of school buildings			
	Percent of adequate actions			All actions
	0%	1% to 99%	100%	
Enclosure	793	524	0	*1,317*
Encapsulate	526	654	6,037	*7,217*
Remove	0	244	28,382	*28,626*
Repair	2,391	0	7,869	*10,260*
All remediation categories	*1,419*	*3,494*	*32,057*	*36,970*

Remediation category	Percent of school buildings			
	Percent of adequate actions			All actions
	0%	1% to 99%	100%	
Enclosure	60%	40%	0%	*100%*
Encapsulate	7%	9%	84%	*100%*
Remove	0%	1%	99%	*100%*
Repair	23%	0%	77%	*100%*
All remediation categories	*4%*	*9%*	*87%*	*100%*

Table 5-6. Differences in adequacy of remediation performed in school buildings, by asbestos material category

Material category	Number of school buildings			
	Percent of adequate actions			All actions
	0%	1% to 99%	100%	
TSI*	1,008	2,939	30,343	*34,290*
Surfacing	0	219	3,389	*3,608*
Miscellaneous	721	555	4,386	*5,662*
All materials	*1,419*	*3,494*	*32,057*	*36,970*

Material category	Percent of school buildings			
	Percent of adequate actions			All actions
	0%	1% to 99%	100%	
TSI*	3%	9%	88%	*100%*
Surfacing	0%	6%	94%	*100%*
Miscellaneous	13%	10%	77%	*100%*
All materials	*4%*	*9%*	*87%*	*100%*

*TSI = Thermal system insulation.

6. ORIGINAL AHERA INSPECTION EVALUATION

The objectives of Research Area 4, Original AHERA Inspection Evaluation, were to evaluate the original AHERA inspection in each school building and to explore possible associations between the quality of the inspections and the inspectors' backgrounds. Westat conducted a telephone survey of the original AHERA inspectors to collect data on their backgrounds.

It is important to note that the analysis presented in this chapter is an evaluation of the original AHERA **inspection**, not just the original AHERA **inspector**. The quality of an inspection clearly depends on the ability of the inspector to conduct a thorough and accurate inspection. However, it also depends on the size and complexity of the school building, the policies and procedures of the inspector's employer, as well as any limitations that may have been imposed by the LEA. Even a good inspector is more likely to err, for example, in a large building built in stages over many years than in a small building.

Inspection companies determine policies that can influence the quality of their employees' work. For example, if an employer rewards its inspectors more for working quickly than for conducting thorough inspections, the inspectors will tend to cut corners in order to get the job done quickly. In addition, the data for the inspection evaluation were taken from Management Plans, which are often prepared by the inspection companies using pre-prepared and automated outlines and report forms. AHERA regulations require that Management Plans be prepared by trained management planners. These outlines and forms tend to induce uniformity in the types of data reported and the manner in which the data are reported. If, for example, a form is missing some aspect of an original AHERA inspection, then the inspection is almost certain to be missing this aspect. Finally, we have been told that LEAs occasionally limit the parts of the school or the range of material types to be inspected.

This chapter first describes and presents the rationale for the system developed to score the original AHERA inspection. Statistics on the performance of the original AHERA inspections relative to this yardstick are then presented. Descriptions of the original inspectors' education and experience are then presented. Finally, statistical measures of the association between characteristics of the original inspectors' backgrounds and the original AHERA inspection score are presented.

6.1 Scoring the Original AHERA Inspection

The Westat project team, in consultation with the expert consultants Dale Keyes, William Ewing, and Steven Hays, and the EPA developed a scoring system to evaluate the original AHERA inspections. The system began with a score applied to each homogeneous suspect material identified in the reinspection. The material score evaluated how well the original AHERA inspector performed with respect to each material. The individual material scores were then aggregated into an overall school inspection score to provide an overall evaluation of the inspection of the school.

6.1.1 Scoring Individual Materials

The project team and consultants identified six factors to measure dimensions of the quality of the inspection and ranked them in their order of importance. The factors may be stated as questions requiring "Yes" or "No" answers. In descending order of importance (in the research team's professional judgment), the six factors are as follows.

1. **Was the suspect material identified?**

   This factor measures the ability of the original AHERA inspection to find and report all suspect homogeneous materials in a building. The research team ranked this factor first because, if an original AHERA inspector failed to identify a specific homogeneous material, then the other five factors would be irrelevant. Credit was given if a material identified during the reinspection was reported, in any manner, in the original AHERA inspection report. Extreme care was taken to account for individual differences in inspection terminology, protocol, or reporting format. For example, some inspections combined pipe run and pipe joint insulation as TSI or combined 9"x9" and 12"x12" floor tile as VAT (vinyl asbestos floor tile).

2. **Was the material assessed appropriately?**

   This factor measures the ability of the original AHERA inspection to provide an assessment for each homogeneous material. Reporting assessment information, in some manner, was ranked second in importance because it directly relates to the potential for fiber release. Credit was given for a friable asbestos-containing material if it was assessed in terms of amount of damage to the material. Many original AHERA inspection reports assessed materials using additional criteria, such as location, quantity, and occupancy, but these were not considered in awarding credit for this score factor as AHERA does not require their use.

AHERA does not require the assessment of nonfriable and nonasbestos materials; points were automatically awarded for these materials.

As time had passed since the original AHERA inspection, Westat assessments were not compared to the original AHERA inspection assessments because they would be invalid.

3. **Did the inspector identify at least 80 percent of the areas in the school with the material?**

This factor measures the ability of the original AHERA inspection to report all the areas or rooms in a building where a suspect homogeneous material is present. This information gives guidance to building occupants on where to guard against potential exposure to asbestos. Credit was given if the original inspection reported a material present in at least 80 percent of the areas in which re-inspectors found the material. The 80 percent cutoff allowed for some difference in area description between the two inspection reports. Original AHERA inspection floorplans, tables, and text were reviewed to locate areas where materials were reported. Where there was reasonable doubt, such as the reinspection finding a material in closets or restrooms, the original AHERA inspection was given credit for having found the material in that area.

This scoring procedure did not result in lost credit for areas where asbestos materials had been totally removed or otherwise abated, as re-inspectors either did not find the material or reported the replacement material.

4. **Was at least 80 percent of the material quantified?**

This factor measures the ability of the original AHERA inspection to report an accurate quantity of each suspect homogeneous material in a building. Credit was given if the original AHERA inspection reported a total quantity of a specific material which was at least 80 percent of the total quantity found by the re-inspector. The 80 percent cutoff allowed for some variance in measurement and estimation. The total quantities of each material in the building were compared, rather than quantities in individual areas, since many original inspections reported only building totals.

Where a significant quantity of a material had been removed or otherwise abated, the re-inspector found either less material or the same quantity of a replacement material, and the original AHERA inspection did not lose credit.

5. **Were the correct number of bulk samples taken?**

This factor measures the ability of the original AHERA inspection to collect at least the minimum number of bulk samples specified by AHERA for each homogeneous material. Credit was given if the following minimum number of samples were collected:

TSI:	at least 3 samples of each TSI; **except** at least one sample of each type of TSI patch less than 6 linear feet/square feet in size, tee, valve, or elbow.
Surfacing:	at least 3 samples for homogeneous areas less than or equal to 1,000 square feet;
	at least 5 samples for homogeneous areas greater than 1,000 square feet and less than or equal to 5,000 square feet;
	at least 7 samples for homogeneous areas greater than 5,000 square feet.
Miscellaneous:	at least 1 sample of each miscellaneous material (some disagreement exists as to the correct number of samples required by AHERA for miscellaneous materials).

Credit was given if the inspection assumed a material contained asbestos. Credit was also given if less than the minimum number of samples were collected, but at least one of the bulk sample analysis results was positive (greater than 1% asbestos).

6. **Were the AHERA assessment categories 1 through 7 used appropriately?**

This factor measures the ability of the original AHERA inspection to properly assign an AHERA assessment category for each friable asbestos-containing homogeneous material. Points were awarded for assigning the AHERA 1 through 7 category (either numerically or in exact words) appropriately. This means that the material type (TSI, surfacing material, miscellaneous material), the amount of damage reported or, where the material was not damaged, the potential for damage reported, matched the AHERA category assigned.

AHERA does not require assessment of nonfriable and nonasbestos materials; credit was automatically given for these materials.

As time has passed since the original AHERA inspection, the reinspection AHERA assessment category was not compared to the original inspection AHERA assessment category because such a comparison is invalid.

The project team and expert consultants assigned point values to each factor consistent with their judgment of its relative importance. Roughly, each factor was deemed to be twice as important as the next most important factor. The formula was modified for Factor 1 because it is impossible to score points on Factors 2 through 6 if the material is not identified. Therefore, if an original AHERA inspector failed to identify a material, a score of zero would be assigned both for Factor 1 and for the material. If Factor 1 were twice as important as Factor 2, then the maximum score would be 64 points; 33 points would be attached to merely identifying the material and achieving no points for any of the other five factors. The research team decided that fewer points should be attached to this level of achievement; we settled on nine points as a reasonable value. This made the maximum material score 40 points.

One may also view the inspection as starting with the maximum possible score, 40 points, and losing points for each "No" answer. Seen this way, the points deducted for negative answers were:

1. Was the suspect material identified?
   40 points deducted if not.

2. Was the material assessed properly?
   16 points deducted if not.

3. Did the inspector identify at least 80 percent of the areas in the school with the material?
   8 points deducted if not.

4. Was at least 80 percent of the material quantified?
   4 points deducted if not.

5. Were the correct number of bulk samples taken?
   2 points deducted if not.

6. Were the AHERA assessment categories 1 through 7 used appropriately?
   1 point deducted if not.

Table 6-1 displays the full material scoring plan. It shows the material score resulting from every possible combination of "Yes" and "No" answers to the six factors. Thus, a material (1) identified in the Management Plan, (2) assessed appropriately by the original AHERA inspector, (3) found in at least 80 percent of the areas where it was located, (4) quantified within 80 percent of the correct quantity, (5) with less than the correct number of bulk samples taken, and (6) with the AHERA 1-7 categories not applied would receive a score of 37.

Before aggregating the individual material scores into school inspection scores, it is informative to examine some statistics on the material scores. Table 6-2 presents the estimated national percentage of "Yes" answers to each of the six factors. The findings in Table 6-2 are consistent with the findings in Chapter 3. Seventy percent (± 5%) of all homogeneous suspect materials were identified by the original AHERA inspectors. Once a material was identified,

Table 6-1. AHERA Inspection Evaluation: Material Scoring Plan

Material score	1. Suspect material identified	2. Material assessed appropriately	3. At Least 80 % of areas identified	4. At Least 80 % of material quantified	5. Correct number of bulk samples taken	6. AHERA categories 1-7 used appropriately
40	Yes	Yes	Yes	Yes	Yes	Yes
39	Yes	Yes	Yes	Yes	Yes	No
38	Yes	Yes	Yes	Yes	No	Yes
37	Yes	Yes	Yes	Yes	No	No
36	Yes	Yes	Yes	No	Yes	Yes
35	Yes	Yes	Yes	No	Yes	No
34	Yes	Yes	Yes	No	No	Yes
33	Yes	Yes	Yes	No	No	No
32	Yes	Yes	No	Yes	Yes	Yes
31	Yes	Yes	No	Yes	Yes	No
30	Yes	Yes	No	Yes	No	Yes
29	Yes	Yes	No	Yes	No	No
28	Yes	Yes	No	No	Yes	Yes
27	Yes	Yes	No	No	Yes	No
26	Yes	Yes	No	No	No	Yes
25	Yes	Yes	No	No	No	No
23	Yes	No	Yes	Yes	Yes	No
21	Yes	No	Yes	Yes	No	No
19	Yes	No	Yes	No	Yes	No
17	Yes	No	Yes	No	No	No
15	Yes	No	No	Yes	Yes	No
13	Yes	No	No	Yes	No	No
11	Yes	No	No	No	Yes	No
9	Yes	No	No	No	No	No
0	No	▨	▨	▨	▨	▨
	Points deducted for a "No".					
	40	16	8	4	2	1

Notes:

1. Scores of 24, 22, 20, 18, 16, 14, 12, 10, and 8-1 are, by definition, impossible for individual materials.
2. The shading on the line for a zero score reflects the fact that, if the material is not identified, then none of the other factors are relevant.

Table 6-2. Inspection quality by scoring factor

Factor	Percent "Yes" among all materials	Percent "Yes" among identified materials
1. Material identified?	70% (± 5%)•	100%
2. Material assessed appropriately?	67% (± 4%)	96% (± 4%)
3. Identified 80% of areas?	42% (± 7%)	60% (± 8)
4. Quantified 80% of material?	41% (± 8%)	59% (± 9%)
5. Correct number of bulk samples?	68% (± 5%)	97% (± 4%)
6. Used AHERA categories appropriately?	31% (± 6%)	45% (± 8%)

•Numbers in parentheses are 95 percent confidence intervals.

nearly all inspectors assessed it appropriately and took the correct number of bulk samples. About three-fifths of materials (± 8%) were adequately located and quantified.

Figure 6-1 displays the estimated national distribution of individual material scores. Thirty percent of materials (± 8%) were scored 37 or higher. Another 37 percent (± 7%) scored between 25 and 36 points, reflecting a failure to adequately locate and quantify the material that had been identified and assessed appropriately.

Figure 6-2 displays the mean material inspection scores by material type. The data in Figure 6-2 reflect the data in Chapter 3. All types of TSI have nearly the same mean score, 28-32 points. Materials that were frequently unidentified, such as vibration dampening cloth (VDC), underquantified, or inadequately located have lower average scores.

Figure 6-1. Estimated national distribution of inspection scores on individual materials

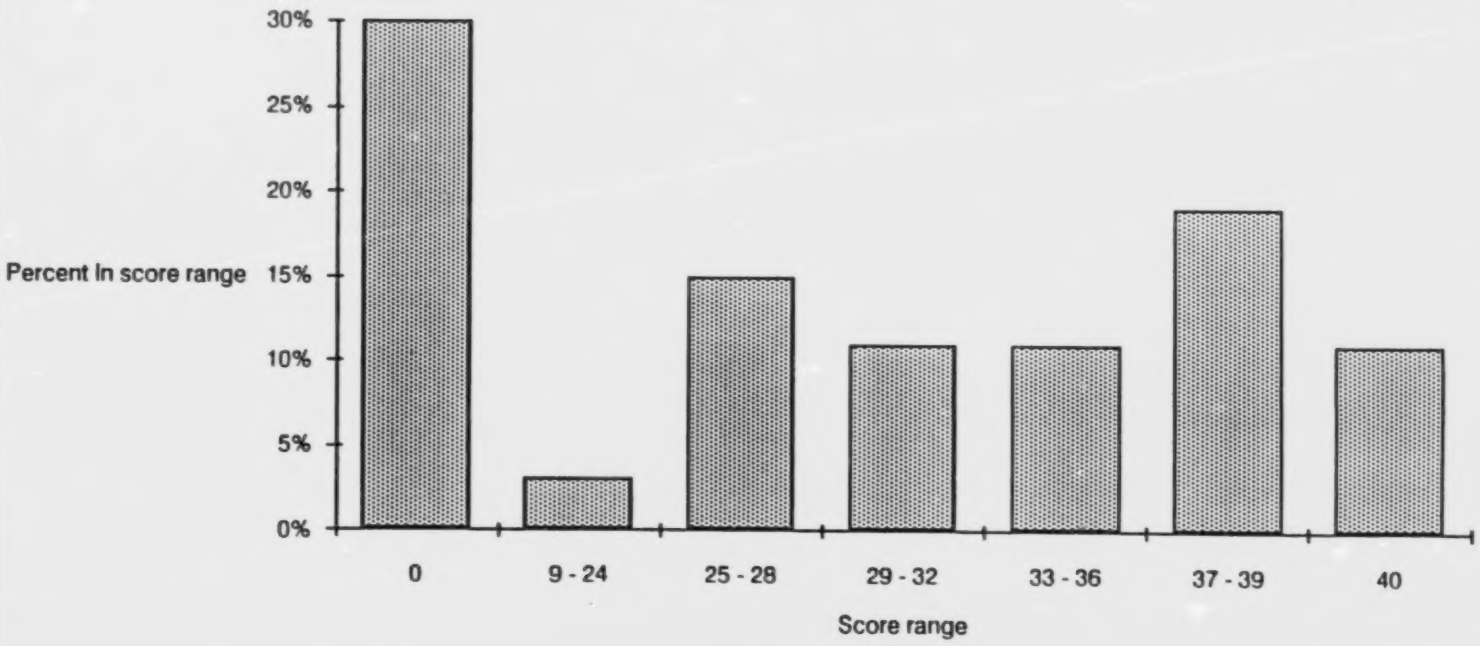
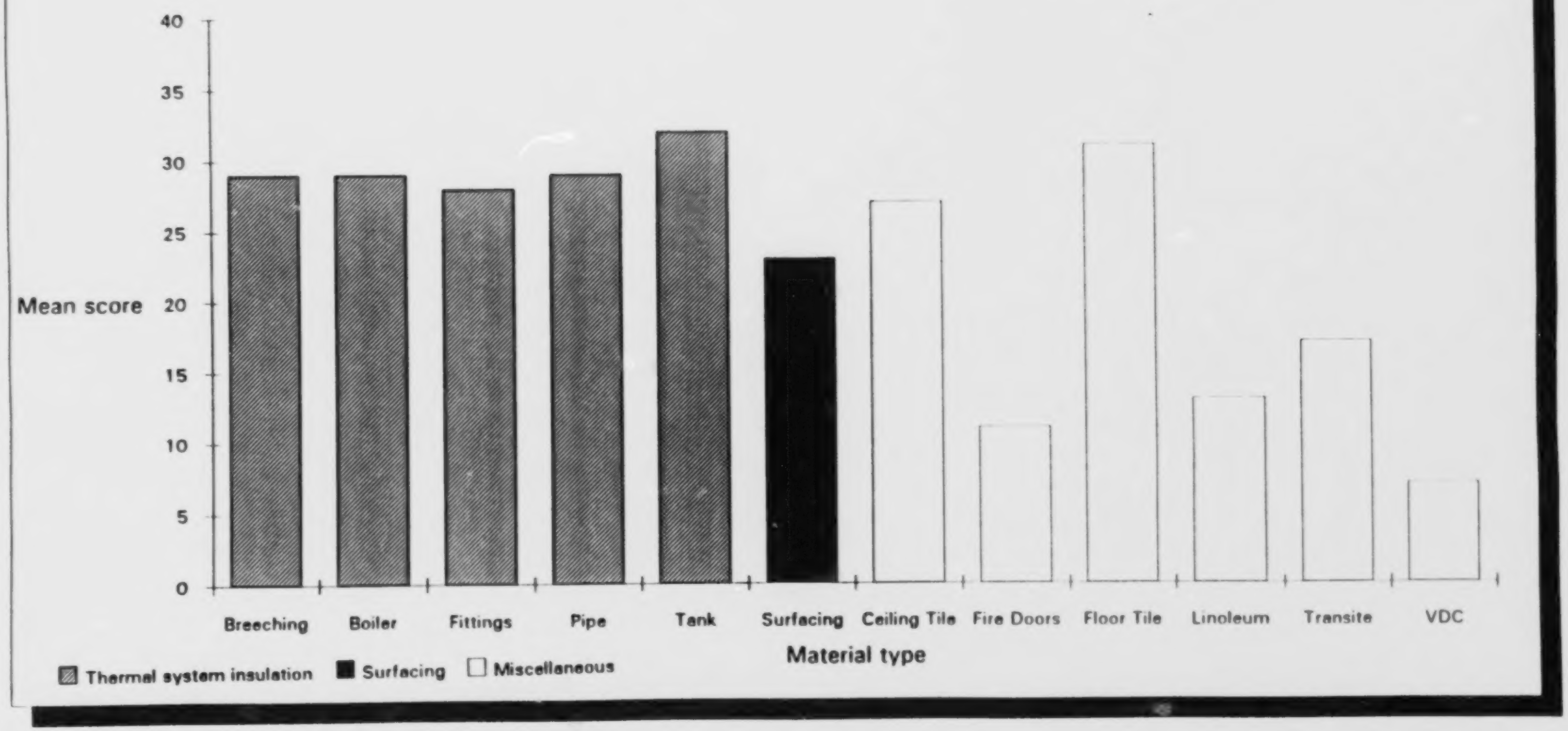


Figure 6-2. Mean inspection score, by material type



6.1.2 School Inspection Score

The individual material scores were combined into a single school score by first computing a weighted average of the material scores, with the weights being the square roots of the respective amounts of material. A discussion of the rationale for this weighting follows an illustrative calculation. Suppose a school had two materials, 10 square feet of duct insulation and 5,000 square feet of surfacing material. Suppose further that the inspector scored 23 on the duct insulation and 36 on the surfacing material. The school average score would then be

$$\frac{(23)(3.16) + (36)(70.7)}{(3.16) + (70.7)} = 35 \text{ points.}$$

Several methods of combining the individual material scores into a single school score were considered. A simple unweighted average is easy to compute and understand. It gives equal weight to every material, from a few square feet of valve insulation, say, to several thousand square feet of surfacing material. In the above example, the unweighted average would be 30 points. This weighting is consistent with the viewpoint that it is important to identify and assess all instances of ACBM. The custodial and maintenance workers need to know the locations of all the ACBM in order to know when to protect themselves and others from potential fiber releases. An alternate viewpoint is that large quantities of ACBM are more important than small quantities. There are, for example, more people potentially exposed to more asbestos from friable surfacing material in an auditorium than from small amounts of duct insulation. This assumption would lead to weighting each material score by the respective quantity of ACBM. In the above example, 5,000 square feet of surfacing material would carry 500 times the weight of 10 square feet of duct insulation. The size-weighted average would therefore, be 36 points.

Table 6-3 summarizes the distribution of the school inspection scores under different weighting functions. Weighting the material scores tends to elevate them, indicating that inspectors performed better on the large quantity materials than on small quantity materials.

Weighting that compromises between the reinspection quantity and square root of reinspection quantity concepts was sought because it was felt that both viewpoints have merit. A mathematical function often used to compromise between these two concepts is the square root of the size. The square root function dampens the influence of large areas of material relative to

Table 6-3. Comparison of different material weightings for computing school inspection scores

Material weight	Percentiles of school inspection scores		
	25th	50th	75th
Reinspection quantity	28	31	35
Square root of reinspection quantity	25	31	35
No weight	18	25	31
Friable materials only, square root of reinsp. quantity	25	31	36

small areas. In the example above, 5,000 square feet of surfacing material would carry 22.4 times the weight of 10 square feet of duct insulation, since the square root of 500 is 22.4.

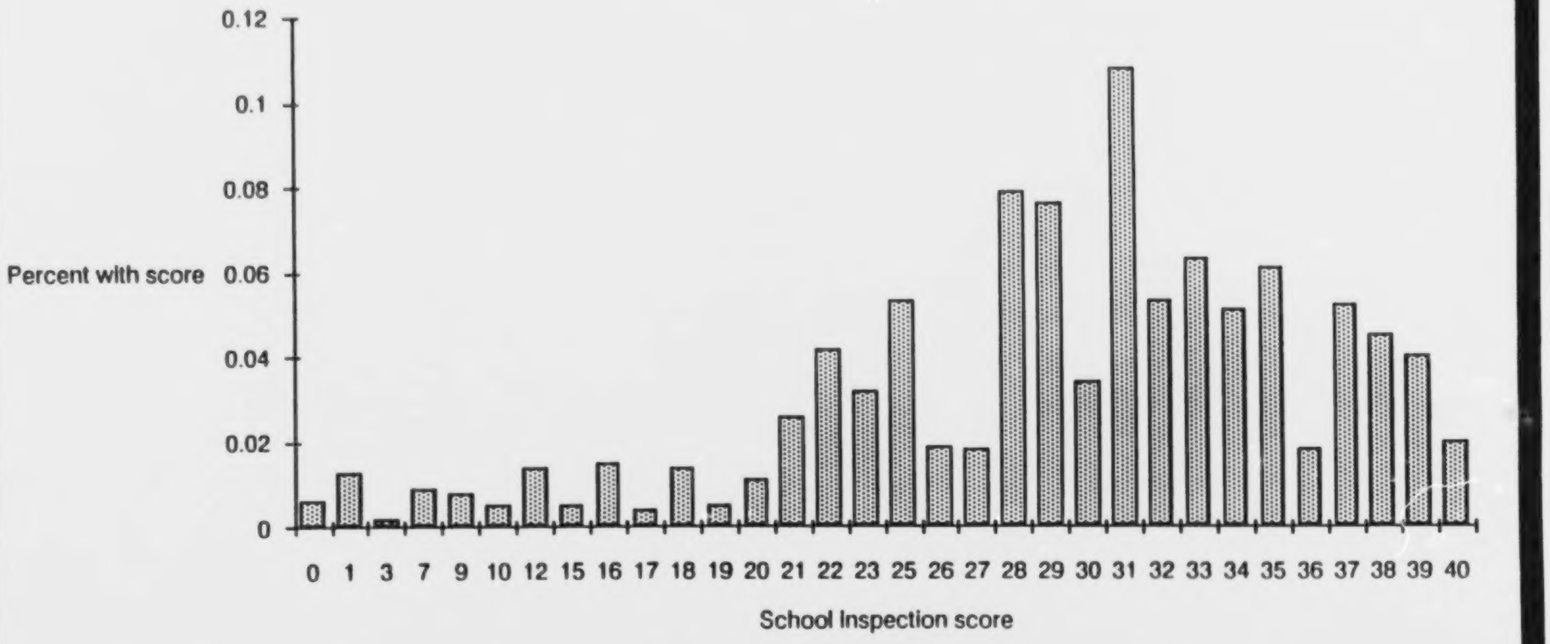
Figure 6-3 presents the distribution of the school inspection scores using the square roots of the quantities as weights. Most inspections scored 25 points or higher, up to 40 points, but there is a long tail of poorer scores, down to 0 points. It is important to remember that a perfect score of 40 still allows for some error in the inspection. For instance, an inspector may miss up to 20 percent of the areas containing each material, and 20 percent of the material, and still score a 40 for each material, leading to 40 points for the school average.

To summarize and evaluate the original AHERA school inspections, the scores were grouped into four ranges, with descriptive phrases associated with each range. The ranges are listed below, along with the interpretation of each range for an "average" material. These interpretations also helped to motivate the specification of the ranges.

Range: 37-40. *"Thorough"*
On average, achieved yes's on the 4 most important factors, but may have received no's on one or both of the other 2 factors.

Range: 29-36. *"Some deficiencies"*
On average, achieved yes's on the 2 most important factors, but either failed to accurately quantify the material or adequately locate it.

Figure 6-3. Estimated national distribution of school inspection scores



Range: 24-28. *"Deficient"*
On average, achieved yes on the 2 most important factors, but neither accurately quantified the material nor adequately located it.

Range: 0-23. *"Serious deficiencies"*
On average, failed to identify the material or assess it appropriately, or may have also failed to adequately quantify or locate the material.

It is important to note that these ranges are for school-wide averages scores. Individual materials in a school will typically have both higher and lower scores. In particular, it is mathematically possible for an inspector to inspect a school with only four materials, miss the smallest one entirely (zero score), and still achieve a school score of 29 (with perfect 40's on the other three materials), which is an inspection with "some deficiencies". Table 6-4 shows the estimated percentages of inspections in each range; it also shows the distribution of score ranges if only friable materials are considered in the inspection.

Table 6-4. Estimated percent of inspections in each range

Range	Percent of schools-includes all materials	Percent of schools-friable materials only
Thorough	16% (± 5%)*	25% (± 10%)
Some deficiencies	46% (± 10%)	34% (± 5%)
Deficient	17% (± 6%)	21% (± 8%)
Serious deficiencies	21% (± 6%)	20% (± 7%)

*Numbers in parentheses are 95 percent confidence intervals.

The introduction to Chapter 6 suggested that a large school would be more difficult to inspect than a small one. Table 6-5 presents the estimated association between the school inspection scores and the number of materials in the school. The percentage of thorough inspections declines as the number of materials increases, from 29 percent (± 12%) in schools with 1 to 5 materials, to 8 percent (± 8%) in schools with 9 or more materials. Similarly, the percent of seriously deficient scores increases as the number of materials increases.

Table 6-5. Association between number of suspect materials in a school and the school inspection score

Estimated number of schools				
	Number of suspect materials in school			
School inspection score range	**1 - 5**	**6 - 8**	**9 & over**	***Total***
37 - 40, Thorough	8,004	3,405	1,758	*13,167*
29 - 36, Some deficiencies	11,638	16,898	10,299	*38,835*
24 - 28, Deficient	2,556	5,938	5,727	*14,221*
0 - 23, Serious deficiencies	5,455	7,257	4,905	*17,617*
Total	*27,653*	*33,498*	*22,689*	*83,840*

Estimated percent of schools				
	Number of suspect materials in school			
School inspection score range	**1 - 5**	**6 - 8**	**9 & over**	***Total***
37 - 40, Thorough	29%	10%	8%	*16%*
29 - 36, Some deficiencies	42%	50%	45%	*46%*
24 - 28, Deficient	9%	18%	25%	*17%*
0 - 23, Serious deficiencies	20%	22%	22%	*21%*
Total	*100%*	*100%*	*100%*	*100%*

Table 6-6 illustrates one cause of poor scores: materials missed entirely (zero material score). Inspections with thorough scores identified all materials in the school nearly half the time and rarely missed more than one material. In contrast, inspections with seriously deficient scores rarely identified all materials in the school and missed two or more materials 80 percent of the time.

6.2 Analysis of Original AHERA Inspector's Background

The research question investigated in Research Area 4 was, "Given the quality of the original AHERA inspection, as shown by a comparison between the reinspection findings and the findings presented in the Management Plan, what is the importance of the original AHERA inspector's training, experience, and background in inspection quality?" Data were collected on the original AHERA inspectors' backgrounds through a telephone survey with the original AHERA inspectors. The questions were asked in a manner that permitted the reconstruction of the inspectors' background at the time he/she conducted the original AHERA inspection in each school in the sample. The original AHERA inspector interview is Form O1, found in Appendix A.

This section presents an analysis of the findings from the original AHERA inspector interviews and the association with the school inspection scores. Table 6-7 presents a profile of the population of asbestos inspectors at the time they conducted the original AHERA inspections in schools. All had AHERA accreditation, had conducted asbestos inspections for a median 14 months, and had inspected a median 45 schools. Over half had finished college and 30 to 46 percent had experience in building trades, environmental occupations, architecture, or engineering. On the other hand, few were professional engineers (PE), certified industrial hygienists (CIH), registered architects (RA), or certified safety professionals (CSP).

We now summarize the results of analyses between the school inspection scores and selected dichotomous attributes of the original AHERA inspectors. Table 6-8 presents the median inspection scores for inspectors who possessed and inspectors who did not possess selected characteristics at the time they inspected the subject schools. None of the differences in Table 6-8 are statistically significant. Taken individually, the possession of the attributes in Table 6-8 has little effect on the median school inspection scores.

Table 6-6. Association between number of missed materials in a school and the school inspection score

Estimated number of schools				
	Number of missed materials in school			
School inspection score range	0	1	2 & over	*Total*
37 - 40, Thorough	5,950	6,783	434	*13,167*
29 - 36, Some deficiencies	8,153	11,517	19,164	*38,834*
24 - 28, Deficient	885	2,865	10,472	*14,222*
0 - 23, Serious deficiencies	273	2,461	14,883	*17,617*
Total	*15,261*	*23,626*	*44,953*	*83,840*

Estimated percent of schools				
	Number of missed materials in school			
School inspection score range	0	1	2 & over	*Total*
37 - 40, Thorough	45%	52%	3%	*100%*
29 - 36, Some deficiencies	21%	30%	49%	*100%*
24 - 28, Deficient	6%	20%	74%	*100%*
0 - 23, Serious deficiencies	2%	14%	84%	*100%*
Total	*18%*	*28%*	*54%*	*100%*

Table 6-7. Selected characteristics of original AHERA inspectors at the time of the original AHERA school inspection

Characteristic	Quantity
Accredited	100%
Median time since accreditation	13 months
Took a refresher course	51% (± 12%)*
Took non-AHERA training in asbestos	65% (± 10%)
Median time since first asbestos inspection	14 months
Median number of buildings inspected	60 buildings
Median number of school buildings inspected	45 schools
Building trades experience	38% (± 13%)
Environmental laboratory experience	30% (± 15%)
Experience in environmental health, occupational health, or industrial hygiene	46% (± 9%)
Architectural or engineering experience	34% (± 8%)
Highest educational level	
High school diploma or GED	19% (± 9%)
Some college	21% (± 10%)
Bachelor's degree	50% (± 13%)
Master's degree	9% (± 6%)
Possessed PE, CIH, RA, CSP certification	11% (± 9%)

*Numbers in parentheses represent 95 percent confidence intervals.

Table 6-8. Median school inspection scores by selected characteristics of the original AHERA inspector

Characteristic	Median score	
	Possessed	Not possessed
Accredited	30	--
Ever taken a refresher course	30	29
Ever taken non-AHERA training in asbestos	30	28
Building trades experience	30	28
Environmental laboratory experience	29	29
Experience in environmental health Occupational health or industrial hygiene	29	29
Architectural or engineering experience	28	30
Highest educational level		
High school diploma or GED	31	--
Some college	29	--
Bachelor's degree	29	--
Master's degree	30	--
Possesses PE, CIH, RA, or CSP	29	29

Table 6-9 presents Pearson correlation coefficients between the school inspection scores and selected ordinal or quantitative attributes of the inspector at the time of the original AHERA inspection. Only one correlation, the highest educational level achieved by the original AHERA inspector, is statistically significant at the five percent level. The correlation is negative, which means that the better educated inspectors achieved lower scores than less educated inspectors. Multiple regression analyses were conducted to analyze the relationships between the school inspection scores and many dimensions of the original AHERA inspectors' backgrounds. None produced statistically significant relationships.

Table 6-9. Pearson correlation coefficients between school inspection scores and selected original AHERA inspector attribute level

Attributes	Mean level	Correlation with score
Months since AHERA accreditation	16	0.06
Months since first asbestos inspection	22	0.05
Number of buildings inspected	135	0.05
Number of schools inspected	98	0.01
Highest level of education	--	-0.20 *
Year of Master's degree	1974	-0.45
Year of Bachelor's degree	1980	-0.09

*Significant at the 0.05 level

The widespread lack of statistically significant associations between the school inspection scores and the original AHERA inspectors' backgrounds is somewhat surprising. One possible explanation for this finding is that the influence of employers' policies and practices cancel out much of the variation between individual inspectors which, in turn, negates the effects of the inspectors' backgrounds.

While we lack statistical data to support this explanation, considerable anecdotal evidence was obtained during the review of the Management Plans. Different Management Plans from the same inspection company were often similar in organization, content, and presentation. They therefore showed similar strengths and weakness in the reporting of the original AHERA inspections. Another possibility is that the scoring scheme did not allow for subtle distinctions in point values between different performance levels.

6.3 Summary

A scoring system was developed to evaluate the original AHERA inspectors' overall performance. The system evaluated the original AHERA inspector's ability to identify a suspect material, assess it appropriately, record where it was located in the school, quantify it within acceptable standards of accuracy, take the correct number of bulk samples, and use the AHERA assessment categories. Each suspect material in a school building was scored on a scale from 0 to 40 according to the original AHERA inspector's performance on that material. Individual material scores were averaged to obtain a school average inspection score. The school average scores were grouped into ranges that characterized the original AHERA inspector's performance. Thorough inspections were performed in 16 percent of schools, inspections with some deficiencies were performed in 46 percent of schools, and inspections with severe deficiencies were performed in the remaining 38 percent of schools.

The primary causes of deficient inspections were failure to identify all suspect material in a school, failure to either record the locations of the ACBM or to quantify it within acceptable standards of accuracy.

Analysis of the association between the school inspection score and the inspectors' training, education, and experience revealed minimal statistical association between the inspection score and any characteristic of the inspectors' backgrounds. This somewhat surprising finding may be due to the fact that many inspection companies use pre-prepared and automated outlines and report shells for the management plans. These forms tend to induce uniformity in the apparent quality of the reported inspections which, in turn, masks the effects of the inspectors' backgrounds. Alternatively, as not all original AHERA inspectors were located for inclusion in the survey, it is possible that a statistical association was not discovered for this reason.

7. PROCESS OF NOTIFICATION

Research Area 5 examined the process by which parents and teaching staff were notified of the asbestos status of their schools. The research included questions about who was notified, the method of notification, response to notification, and projections about different parental and teacher reactions to various types of notifications.

Two different research methods were used for this Research Area. The first method was quantitative data collection (telephone and in-person interviews with principals, active parents, and teachers from our sampled schools). The statistical data collected to answer the questions for Research Area 5 contain three distinct groups of respondents, principals, teachers, and parents, who voiced three different opinions. The first group, principals, spoke about notifications of parents by the school and LEA. The second, active parents (53% were PTA officers, 26% were PTA officers who also held another role in the school, 9% were parent volunteers, and 11% held another active parent role in the school), spoke about notifications received by all parents. The third, active teachers (47% were a teacher's union representative, 23% were teacher's union representatives who also served in another role, 10% were teachers who volunteered their time on extracurricular school activities, 8% were committee members, and 12% served their school in another role in addition to teaching), recounted the experience of all teachers at the school with regard to notification. Because these respondents were selected purposively rather than randomly, they do not statistically represent other parents and teachers at that school. One can, however, say that they statistically represent other active parents and teachers nationally.

The second research method used for data collection in this Research Area was qualitative. Focus group interviews with parents and teachers were held in St. Louis, Missouri; Boston, Massachusetts; Seattle, Washington; and New Orleans, Louisiana. Participants were selected by separate focus group facilities, each using their own recruitment method. Parents were active in the school and had a child in any of grades 1 through 12 in a school built prior to 1975. The sample was restricted to schools built before 1975 to increase the chance that the school had ACBM at the time of the original AHERA inspection. Teachers had taught any of grades 1 through 12 at a single school for two or more years. Detailed analysis of the focus groups results is presented in Appendix B. The data collection results are presented in this chapter for each of the research questions.

7.1 Persons Notified

The initial question in Research Area 5 was, "Who has been notified?" The approach to this question included a statistical review of parents', teachers', and principals' answers as well as the recollections of parents and teachers who participated in focus groups.

Survey Results

Statistical data to answer the research question, "Who has been notified?", were collected through in-person interviews with principals and telephone interviews with active parents and active teachers in the sampled schools. One parent and one teacher from each school in the study were interviewed. Perhaps the most interesting finding of this aspect of the evaluation was that a surprisingly large number of parents [23% (± 6%)] and principals [10% (± 5%)] did not know if notifications about AHERA had been sent to parents (Table 7-1). In combination with those parents who reported that there was no notification, half of the schools like those in the study did not notify parents at all, or did not do so in a way that they remembered being notified. Moreover, nine percent (± 4%) of principals admitted that their schools did not send notifications to parents. (Thus, a total of 19% of principals either did not know if notification had been made or knew that it had not.) With regard to teachers, 18 percent (± 9%) reported that they were never notified.

In the case of principals and parents reporting about notification to parents, the facts that underlie the statistics are the same, though recall bias has led to different statistics. Many parents throughout the survey answered "Don't know" (DK) to questions, despite our attempts to prompt an answer through probes and other standard survey techniques. It is also possible that principals may have overreported notifications to show their school's compliance with this aspect of AHERA. In general, however, we believe that principals, who have recourse to files and other records, are probably presenting the most reliable information on notification of parents.

Table 7-1. Percent of schools notifying parents and teachers about activities pertaining to asbestos since December 1987

	Yes	No	DK
Principals report about notification of parents	82%	9%	10%
Parents report about notification of parents	49%	27%	23%
Teachers report about notification of teachers	76%	18%	5%
		Base = 83,840 schools	

In the case of teachers, the only source of information we had about notification was the teachers themselves. Teachers, like parents, are subject to a recall bias though, in general, the percent of teachers who answered "don't know" to questions was smaller than that for parents. This difference was statistically significant at the 95 percent confidence level.

AHERA calls for notification not just once, but at least once each school year. Table 7-2 presents the percent of parents and teachers who received notifications more than once.

Table 7-2 shows that, of schools where notification occurred, 66 percent (± 10%) of school principals reported that they notified parents more than once. However, parents recalled being notified more than once in only 51 percent (± 8%) of schools. This difference is statistically significant at the 5 percent significance level. Teachers in 62 percent (± 8%) of the schools recalled being notified more than once.

Parent and Teacher Focus Group Results

Few of the parents in the focus groups recalled being notified of the asbestos status of their school as required by the AHERA regulation. The exception was parents in St. Louis, where all remembered being notified. A somewhat greater number of teachers than parents remembered being notified across the four locations. In all four groups, both teachers and parents in Catholic

Table 7-2. Percent of schools notifying parents and teachers once and more than once

	Only once	More than once	DK
Principals report about notification of parents *(Base = 76,396 schools)*	23%	66%	10%
Parents report about notification of parents *(Base = 60,851 schools)*	10%	51%	38%
Teachers report about notification of teachers *(Base = 68,338 schools)*	21%	62%	17%

schools recalled both being notified and the contents of the notification. This occurred to a greater extent than with teachers and parents in any of the public school systems, with the exception of one group.

7.2 Method of Notification

The second question in Research Area 5 was, "Were these people notified through a letter, meeting, article in a school newspaper, or in another way?"

Survey Results

Table 7-3 shows the percent of schools in which each category of respondent recalled notification occurring, when specific methods were used to notify parents. Principals stated that the most common method of notification was through letters. Fifty-two percent (± 9%) of schools that notified parents did so in a regular letter or notice sent to parents. An additional 52 percent (± 10%) of schools like those in the survey notified parents in a special letter or notice about asbestos in the school. Parents recalled being notified by both of these methods in approximately

Table 7-3. Percent of schools using specific methods to notify parents and teachers [1, 2]

Method of notification	Principals about notification of parents	Parents about notification of parents	Teachers about notification of teachers
Notified in regular letter/ notice	52%	42%	33%
Notified by special letter/ notice	52%	41%	54%
Notified at regular PTA meeting	32%	25%	12%
Notified at regular teachers' meeting	NA	NA	57%
Notified at special (PTA/ teacher) meeting	6%	5%	3%
Notified by official press release	23%	20%	19%
Notified in some other way	18%	9%	20%
	Base = 76,396 schools	*Base = 60,851 schools*	*Base = 68,338 schools*

[1] Columns do not total 100 percent as multiple responses were allowed.

[2] "No" and "Don't know" responses to question excluded.

40 percent of the schools [42% (± 9%) and 41% (± 8%)]. While this response represents a 10 percent difference in level of parents recalling this type of notification compared to that of principals, the relationship is not statistically significant at the 5 percent significance level.

The second most common method of notification was verbally at a regular PTA meeting, though this method of notification is not considered adequate under AHERA. Thirty-two percent of principals (± 10%) recalled notifying parents in this way, while the parents in 25 percent (± 10%) of schools in which they recalled notification occurring, recalled this type of notification.

Content of the notification is an additional area of research relevant to the method of notification. Table 7-4 presents information on the presence of various important elements in notifications to parents and teachers, for those who recalled being notified. The study team developed a list of these important elements as a means of determining the completeness of notifications.

Table 7-4 shows serious differences between the notification principals recalled sending to parents and what the parents recalled. While 84 percent (± 7%) of schools (according to principals) notified parents of the availability of a Management Plan, only 27 percent (± 7%) of schools (according to parents) sent this information. This difference is statistically significant at the 5 percent significance level. Although there are some ambiguities in the notification section of the AHERA legislation, the study team felt that the regulation does require notification of parents of the existence and availability of the Management Plan for review.

A different pattern exists, however, in parent and principal recall on whether the notification included the location of ACBM, the occurrence of response actions, and general asbestos information. For these three items, in schools where notification occurred, the percentage of parents who recalled being notified was much closer to that of principals who recalled sending these elements. In all three cases, however, the difference between principals and parents is statistically significant at the 5 percent significance level.

Table 7-4 also presents teachers' comments on the contents of the notifications they received. Teachers in only 28 percent (± 6%) of schools recalled receiving information on the availability of the Management Plan. This was the only notification element studied for which teachers recalled being notified less frequently than did parents.

Parent and Teacher Focus Group Results

Of the parents and teachers participating in the focus groups who recalled being notified, all were notified by letter or memo from the school district or school. Many parents and teachers who did not recall being notified, however, still expressed some knowledge about the asbestos status of their school through non-AHERA notifications. Some focus group participants

Table 7-4. Percent of schools with various contents in notification as reported by principals, parents, and teachers[1,2]

Key element	Principals report about parents			Parents report about parents			Teachers report about teachers		
	Yes	No	DK	Yes	No	DK	Yes	No	DK
Availability of Management Plan	84%	6%	10%	27%	12%	60%	28%	30%	42%
Notice of initial AHERA inspection	76%	13%	10%	40%	8%	52%	45%	24%	31%
Location of ACM	38%	52%	10%	32%	18%	49%	52%	23%	24%
Occurrence of response actions	46%	44%	10%	37%	15%	47%	57%	17%	26%
General asbestos information	36%	53%	10%	35%	19%	46%	52%	22%	26%
	Base = 76,396 schools			*Base = 60,851 schools*			*Base = 68,338 schools*		

[1] Columns do not total 100% as multiple responses were allowed.

[2] "No" and "Don't know" responses excluded.

recalled being notified under the Asbestos in Schools Rule[1], while others had learned while serving on the school board, hearing or reading about an asbestos removal or, most frequently, through hearsay. In particular, many of the teachers who expressed some knowledge of the asbestos status of their schools had learned this through word of mouth or personal encounters with asbestos inspectors.

7.3 Response to Notification

The third question in Research Area 5 was, "After notification occurred, did parents review the Management Plan, attend meetings to discuss asbestos in the school, or respond to notification with any other action?"

Survey Results

In drafting the notification element of AHERA, EPA was concerned about how parents, and to a lesser degree teachers, would react to notification. This question encompassed three factors: frequency of reaction, actions taken in response to notification, and intensity of reaction. This section addresses all three concerns.

Table 7-5 shows the percent of schools with notifications where parents and teachers reacted to them. As this table shows, in 73 percent (± 8%) of schools no parents reacted according to principals, while in 55 percent (± 8%) of schools no parents reacted according to parents, and 80 percent (± 7%) of schools had no teachers reacting according to teachers. Moreover, most of those schools where either parents or teachers did react, had only a few who responded [14% (± 4%) of parents according to principals, and 7% (± 4%) of parents according to parents.] The parents or teachers in a school reacted very rarely.

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[1] 1982, EPA Asbestos-in-Schools Identification and Notification Rule.

Table 7-5. Percent of schools with notifications where parents and teachers reacted to notification, as reported by principals, parents, and teachers[1]

	None	A few	Some	Many	All	DK[2]
Principals report about parents' reactions *(Base = 76,396 schools)*	73%	14%	2%	0%	< 1%	10%
Parents report about parents' reactions *(Base = 60,851 schools)*	55%	7%	4%	1%	< 1%	33%
Teachers report about teachers' reactions *(Base = 68,338 schools)*	80%	6%	4%	3%	< 1%	7%

[1] "No" and "Don't know" responses to question about notification excluded.

[2] "Don't know" the answer to this question.

Table 7-6 illustrates the types of actions notified parents and teachers have taken in response to notification. The most frequent actions were requests to review the Plan and requests for additional information about asbestos and the inspection [5% (± 4%) and 7% (± 5%) of parents as reported by principals]. Other reactions included requests for information on the costs of asbestos remediation, and positive reactions such as *"positive comments that school is taking care of the problem."* The most extensive reaction was in response to an *"illegal removal of tile, a call chain was begun to inform parents of what was going on,"* and to force the company removing the tile to stop. Extensive reactions like this occurred in less than 1 percent of schools nationally.

Among the teachers, the reactions were similar to those of the parents, though more teachers had no reaction and fewer did not know if there was teacher reaction. The most important difference between parent and teacher reaction was that at least one teacher requested a transfer from the room in which he/she taught in less than 1 percent of schools in our sample.

The final point of EPA interest was the level of concern, compared to the number of people expressing concern, felt by parents and teachers. Table 7-7 shows the percent of schools in which parents and teachers expressed different levels of concern about their school's asbestos situation. The differences among the responses for the three groups in this table are not

Table 7-6. Percent of schools where parents and teachers took specific actions in response to notification[1]

Key element	Principals report about parents			Parents report about parents			Teachers report about teachers		
	Yes	No	DK[2]	Yes	No	DK[2]	Yes	No	DK[2]
Request to review Management Plan	6%	84%	10%	4%	34%	61%	3%	70%	27%
Request for additional information	7%	83%	10%	4%	35%	60%	12%	63%	24%
Request for special meeting to discuss asbestos	1%	89%	10%	2%	54%	43%	1%	84%	15%
Request to add asbestos to meeting agenda	2%	88%	10%	3%	56%	40%	4%	81%	15%
Request to change child/teacher classroom	0%	90%	10%	0%	64%	36%	< 1%	87%	13%
Other reactions	7%	78%	14%	7%	56%	37%	4%	82%	13%
	Base = 76,396 schools			*Base = 60,851 schools*			*Base = 68,338 schools*		

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[1] "No" and "Don't know" responses to questions about notification excluded.

[2] "Don't know" the answer to this question.

Table 7-7. Percent of schools where various degrees of concern were expressed by parents and teachers as reported by principals, parents, and teachers[1]

	No concern	Little/Some concern	Considerable concern	DK[2]
Principals report about parents' reactions *(Base = 76,396 schools)*	73%	9%	7%	10%
Parents report about parents' reactions *(Base = 60,851 schools)*	56%	3%	9%	32%
Teachers report about teachers' reactions *(Base = 68,338 schools)*	80%	3%	10%	7%

[1] "No" and "Don't know" responses to question about notification excluded.

[2] "Don't know" the answer to this question.

statistically significant at the 5 percent significance level. In general, it can be said that parents in 55 percent (± 8%) of schools expressed no concern, and 80 percent (± 7%) of teachers expressed no concern. Overall, less than 3 percent (± 3%) expressed considerable concern. The remainder expressed little/some concern.

Parent and Teacher Focus Group Results

The parent and teacher focus group responses fall into two categories. The first category includes parent and teacher reaction to the actual notifications that they received. The second category includes parental and teacher projections of their reactions to three different notification letters and various techniques of notification discussed in the focus groups (see Appendix B). By projections we mean that, after each example of a notification was discussed, we asked the participants to describe what they thought their reaction to that type of notification would be.

Few participants recalled being notified, but for those who did, reactions were just about nonexistent: None of the parents or teachers present called their principal or AHERA designated person, or reviewed their school's Management Plan. In short, none of the 40 participants in these focus groups described any actions resulting from their current knowledge about asbestos in their schools, and the few who had been notified under AHERA were no exception.

By contrast, projected reactions to the examples of notifications were somewhat more intense. Participants in each group were shown the four examples of notifications (presented in Appendix B). These four examples were presented in the same order in each group, and each represented a different level of notification. Many participants projected that they would call the principal or AHERA designated person in response to each of the example notifications. In many cases, the teachers' and parents' involvement in the school was such that their own assertion that they would place a call in response to the notification was not surprising. (Several participants were heads of PTAs or PTOs[2] and one participant was on the local equivalent of the school board.) Nevertheless, the striking difference between actual responses to notifications and projected reactions leads one to conclude that possibly the participants projected more strenuous reactions than they would actually undertake.

Despite this seeming inconsistency of the projected reactions to notification as compared to actual reactions, only a handful of participants said that they would review their school's Management Plan after receiving any of the notifications. About an even number of teachers and parents said that they would review the Plan, and these responses occurred about equally frequently in response to each of the three sample notifications.

No participants predicted parental or staff reaction to our examples of notifications more strenuous than making a phone call, visiting the AHERA designated person, or perhaps reviewing the school's Management Plan. The strongest reaction suggested by only a very few participants was the possibility that some parent might request that a child be removed from a particular classroom. No one mentioned physically removing the asbestos-containing building materials, filing a lawsuit, or taking action other than information collection.

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[2] PTA is the acronym for Parent Teacher Association, while PTO stands for Parent Teacher Organization.

7.4 Alternative Notification Contents

Parent and Teacher Focus Group Results

Focus group discussion was the only data collection technique used to research the question, "What might parent and staff reactions be to differently worded notification letters?" The discussion centered on four examples of notifications (see Appendix B) as well as participant ideas on ideal contents of a notification.

Three examples were in the form of letters or memos from the school to the parents. The briefest and least detailed (West Township Example) was considered *"unclear"* and to be intentionally hiding the actual findings of the school. Only a handful of participants expressed satisfaction with the level of detail in this example.

The second example (South Community Example) was received more positively. Specific problems with this example ranged from *"too much detail"* to *"too little detail"*. Many participants in the groups said that if they received this notification they would still call either the AHERA designated person or their school principal to learn specifically where asbestos-containing material was located and its condition.

Group reaction to the third example (North Community Example) ranged more widely among the groups than reactions to the other two notifications. While participants in all of the groups thought this example was too long, group reactions differed on the value of the detail in the letter. Reactions to the level of detail ranged from generally positive to ambivalent. Some participants thought the letter was informative and helpful. Others thought that some of the detail in this example was unnecessary and even irritating:

In general, parents and teachers who had a lot of confidence in their school district thought that the presentation of the list of ACBM materials in the North Community Example was unnecessary. Those with less confidence thought that the list of ACBM should be included. Group members who participated in school activities most heavily were more accepting of the length and level of detail presented in this example.

Discussion about the fourth example (Appletree Example) focused more on the method of dissemination (i.e., newsletter vs. letter or memo) than on its contents. Nevertheless, most participants strenuously objected to the *"oversimplified"* and *"cursory"* nature of the text. Reaction to disseminating notification information through a newsletter as opposed to a letter or memo was less strong, though most participants preferred a letter or memo format. These participants thought that information in a newsletter might *"get lost visually"* while a letter devoted to a topic would not.

Ideal Contents

Discussion of ideal contents for a notification letter also occurred. During the discussion, several groups suggested the following items as recommended contents of a notification:

- Location of asbestos-containing building materials and a plan of action to respond to the asbestos;
- Time frame for response actions;
- Definition of friability;
- Availability of a school-based asbestos resource person;
- Explanation of the health risks of asbestos; and
- A simple cover letter attached to a more detailed technical or material-by-material report.

7.5 Summary

The goal of Research Area 5 was to evaluate parent and teacher reactions to notification. This topic was studied through both focus groups and survey interviews with principals, parents, and teachers. The survey shows that principals recalled notifying parents about the presence of a Management Plan. By contrast, both the survey and focus groups showed that often neither parents nor teachers did not recall either being notified or the contents of the notification. Letters were most commonly used for notification. In the focus groups we learned that both parents and teachers believed this to be the most effective method of notification, particularly if the letters are mailed rather than hand-delivered.

Both the survey and the focus groups showed that parent reactions to notifications tended to be slight. Of the principals who could recall whether parents reacted to notification, 81 percent reported that parents had no reaction at all to notification. In the focus groups, almost no one recalled reacting to notification, and only a handful of participants predicted that they would react to any of the model notifications presented to them. Among those who did react, or who predicted that they would react, the range of actions was small. They included only such activities as reviewing the Management Plan, calling the AHERA designated person for additional information, and requesting that the topic of asbestos be added to a meeting agenda.

Through the use of focus groups we also explored preferences for types of notifications. Both parents and teachers were eager for a much more thorough level of notification than they have experienced to date. Specifically, they wanted a school-based notification mailed to each parent. They wanted this letter to contain the name and telephone number of the AHERA designated person, a description of any planned response actions and the associated timetable, and brief but informative health risk information.

8. MAINTENANCE AND CUSTODIAL WORKER TRAINING AND EXPERIENCE

Research Area 6 studied the level of training and types of work responsibilities of maintenance and custodial personnel. The two different research methods used for this Research Area were in-person interviews with AHERA designated persons and a qualitative data collection effort. The qualitative effort consisted of focus group interviews in St. Louis, Missouri; Boston, Massachusetts; Seattle, Washington; New Orleans, Louisiana; and Bethesda, Maryland with maintenance workers and custodians from schools where asbestos was present. Participants were recruited using lists of maintenance workers and custodians obtained from locals of several employee unions, including the American Federation of State, County, and Municipal Employees and the Service Employees International Union. In addition, the study team contacted Catholic and other private schools to obtain names of potential participants.

Participants in these group discussions, as in most focus groups, were not randomly sampled. Rather, in each group we attempted to have a mix of maintenance workers and custodians, and a mix of types of schools. On the other hand, we attempted to decrease the possibility of a union sending only those with strong opinions on asbestos by requesting long lists of names from each union and selecting the workers ourselves.

Maintenance workers are responsible for repair and upkeep of systems such as plumbing, heating ventilation, and air conditioning. Custodians are responsible for janitorial jobs and, in some cases, minor maintenance such as changing light bulbs. AHERA requires that all members of a school's maintenance and custodial staff receive awareness training of at least two hours, if they work in a building that contains ACBM, whether or not they are required to work with ACBM. Moreover, AHERA requires that all staff who conduct any activities that will result in the disturbance of ACBM receive 14 hours of training in addition to the two hours of awareness training (a total of 16 hours). Some of the consultants working on the AHERA evaluation believe that a custodian responsible for sweeping and dusting in an area with ACBM should receive the full 16 hours of training, while others believe that only direct contact with ACBM necessitates 16 hours of training. We present results of the data collection effort for each research question.

8.1 Training of Maintenance and Custodial Workers

The first question in Research Area 6 was, "Are custodians and maintenance workers trained to work with and around asbestos?" Data were collected on this topic through an in-person survey of AHERA designated persons and focus groups with maintenance and custodial workers.

Survey Results

To answer this research question, interviews were conducted with the AHERA designated person from each sampled school. In districts where more than one school was sampled, each ADP was asked questions about maintenance worker and custodian training for each school in the study.

Westat understands that the training reported by the ADPs may not accurately reflect the level of training actually received by maintenance workers and custodians for several reasons. First, ADPs may be motivated to over-report the number of training courses to show a greater level of compliance with the AHERA regulation than actually occurred. Second, there may be a difference between the percent of schools that offer training and the percent of maintenance workers and custodians actually trained (e.g., due to absenteeism, not all maintenance workers or custodians in a school will be trained by any given course). Finally, there are questions about what maintenance workers and custodians retain from their training courses, and whether individuals who do not recall being trained, or do not retain significant portion of the contents of a course, can be called "trained."

All of these concerns are valid. A research methodology where AHERA designated persons, maintenance workers, and custodians were all interviewed on the topic of training received could have produced more reliable and complete data than that produced by interviewing only AHERA designated persons. However, we found during early discussions with schools on the study design that many schools were unwilling to have their maintenance workers and custodians interviewed. When school superintendents were asked about this, they said they would be happy to have their schools involved in the study if it involved participating in a reinspection, review of Management Plans, interviews with AHERA designated persons, and principals. However, they would refuse to have support staff such as maintenance workers and custodians "represent" their school district to the world. Because we did not want to jeopardize the response rate for the overall evaluation, we decided to interview the ADP as the sole representative of school and district training practices.

The information presented in this chapter is based on the estimated 83,840 schools nationally that had performed an AHERA inspection, found asbestos-containing materials, and wrote a Management Plan.

Table 8-1 shows that 87 percent (± 9%) of schools like those in the study had provided maintenance workers asbestos-related training in the post-AHERA period. The case can certainly be made that schools should be responsible for ensuring that this type of worker is trained, but in fact, almost all schools that used outside vendors for maintenance work [7% (± 6%) of schools] did not know if the workers had received any training about ACBM or its locations in their school. Outside vendors considered for this study were companies which provided maintenance and/or custodial services to the school. Vendors did not include people such as telephone cable installers.

Table 8-1. Percent of schools providing maintenance and custodial worker training since October 1987

Training provided	Maintenance workers	Custodians
Yes	87%	95%
No	7%	3%
School does not have this type of employee	7%	2%
		N=83,840

At times, the ADP identified people as maintenance workers when, in fact, they did not perform traditional maintenance worker activities or, if they did, they did so without contact with ACBM.

School performance on training for custodial workers was not statistically different than that for maintenance workers at the 5 percent significance level. As shown in Table 8-1, 95 percent (± 6%) had conducted one or more training classes for custodial workers since October 1987.

Some of the schools that did provide training may not employ staff requiring training under AHERA. For instance, if an individual worker's responsibilities never call for him or her to work in a building with ACBM, the worker might not require training. Similarly, if all ACBM discovered in the school has been removed, a worker would definitely not require training. Information about worker responsibilities cannot be learned from the AHERA evaluation.

Table 8-2 shows the percent of schools which have provided training to maintenance and custodial workers employed by the LEA. As shown in Table 8-2, a total of 85 percent (± 10%) of the schools meeting the three study criteria[1] have conducted both a maintenance worker and a custodial training since October 1987. Importantly, 3 percent (± 3%) of schools have not trained either their maintenance or custodial workers at all.

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[1] 1) Buildings built more recently than October 1988; 2) Buildings where the original AHERA inspection found no asbestos; and 3) Buildings where no inspection was conducted in response to AHERA or where no Management Plan was prepared.

Table 8-2. Percent of schools providing training to maintenance and custodial workers since October 1987

LEA-employed		Outside vendor	Percent
Trained	**Not trained**		
Maintenance worker		Custodial worker	1%
Maintenance worker, Custodial worker			85%
Custodial worker	Maintenance worker		4%
Custodial worker		Maintenance worker	6%
	Custodial worker	Maintenance worker	1%
	Maintenance worker, Custodial worker		3%
		Maintenance worker, Custodial worker	1%
			N=83,840

Table 8-3 illustrates the duration of training offered to custodians and maintenance workers. The AHERA regulation requires 16 hours of training for staff with traditional maintenance worker responsibilities in schools in which asbestos-containing materials were found. These workers could, therefore, potentially require less training under AHERA if the maintenance workers do not work around ACBM. Nevertheless, Table 8-3 shows that only 22 percent (± 5%) of schools that trained their maintenance workers provided 16 or more hours of training. The population to which we are projecting (N), used in tables throughout this section, varies. This reflects differences in training and employment patterns for these two different types of school support staff.

Table 8-3. Percent of schools providing various lengths of maintenance and custodial worker training since October 1987

Length of training	Maintenance workers	Custodians
Less than 2 hours	2%	5%
2 hours	36%	62%
3-15 hours	26%	15%
16 or more	22%[1]	12%[1]
No training offered	7%	3%
School does not have this type of employee	7%	2%
		N=83,840

[1] AHERA recommended minimum duration of training for this type of worker when job responsibilities require him/her to come in contact with ACBM.

Table 8-3 also shows that 89 percent (± 5%) of the courses offered to custodians were two hours or longer, which is to say that 9 out of 10 schools' custodial training courses are in compliance with the AHERA guidelines for length of awareness training. Awareness training is required for those workers who would not come into contact with or disturb ACBM. However, 5 percent (± 6%) of the courses were under two hours, indicating that a small percentage of schools do not meet the minimum length for AHERA awareness training requirements. Anecdotally, we can say that custodians in many schools nationally have jobs requiring that they work with ACBM. According to AHERA, these workers should have received 16 hours of training. Only 12 percent (± 8%) of custodians have received this level of training. The difference between the duration of custodial and maintenance worker training received is statistically different at the 5 percent significance level for training of two hours and training that lasted 16 hours or longer.

The frequency of training and the schedule on which it is offered are also important elements in knowing about the current knowledge of asbestos of maintenance workers and custodians. Table 8-4 shows the schedule on which training was offered to maintenance workers and custodians in schools. The largest number of schools offered training annually [36% (± 11%) for maintenance workers and 39% (± 12%) for custodians], on an as needed basis [22% (± 4%)

and 24% (± 8%) respectively], or upon hiring a new employee [10% (± 7%) and 10% (± 7%) respectively]. The differences between the responses for maintenance workers and custodians are not statistically significant at the 5 percent significance level for any of the responses in Table 8-4.

Table 8-4. Percent of schools with different training intervals for maintenance workers and custodians

Training interval	Maintenance workers	Custodians
Once a month	1%	1%
Once every 2 months	3%	3%
Once every 6 months	2%	3%
Once a year	36%	39%
As needed	22%	24%
Upon hiring a new employee	10%	10%
None at this time	6%	6%
On another schedule	7%	8%
No training offered	7%	3%
School does not have this type of employee	7%	2%
		N=83,840

Finally, provisions for training newly-hired maintenance workers and custodians is shown in Table 8-5. The table shows that schools have made almost identical provisions for training newly-hired maintenance workers and custodians. Fifty-one percent (± 6 %) of maintenance workers and 59 percent (± 5%) of custodians are trained within one year of hire. Thirteen percent of schools train both types of worker (± 7%) on some other schedule or through another method such as an outside consultant. None of the differences between custodial and maintenance training shown in Table 8-5 are significant at the 5 percent significance level.

Table 8-5. Percent of schools with different provisions for training newly-hired maintenance workers and custodians

Training provisions	Maintenance workers	Custodians
Trained within one month of hire	19%	21%
Trained between 32 days and 6 months	21%	24%
Trained between 183 days and 1 year	11%	14%
After hired, trained in 2-hour session, audiotape, or videotape	12%	13%
No provisions as no new workers have been hired	10%	11%
Other method	13%	13%
No training offered	7%	3%
School does not have this type of employee	7%	2%
		N = 83,840

Maintenance and Custodial Worker Focus Group Results

A majority of the maintenance workers who participated in the focus groups reported receiving at least the AHERA required hours of training, given their specific job responsibilities. These workers received two to four days of training. There were three exceptions. The first was for several workers whose job responsibilities do not indicate a need for anything other than an awareness course, which they received. Several of these courses were four hours in length. A second exception was for workers who received awareness training and did work with and potentially disturb ACBM. This training was not adequate for their job responsibilities, and they should have received the 16-hour course. The final exception was that a few maintenance workers received no training at all, simply being told not to work near asbestos. Since these workers were working in buildings with ACBM, they should have received an awareness course at a minimum.

The asbestos-related job responsibilities of the few maintenance workers who fall under the last two exceptions, 2 and 3 above, show clearly that the school districts concerned are not in compliance with AHERA. These workers were either not trained at all or they received only awareness training.

Most custodians received two to four hours of training since October 1987 and thus met or exceeded the required level of awareness training. One custodian was sent to a one-week course with the idea that he would be working with asbestos, but his job responsibilities do not currently require this knowledge. However, many custodians also worked with ACBM and had not received the required 16-hour minimum training.

The few custodians who received no training were concerned about the negative health effects of asbestos. They wanted to get some information about asbestos. One of these custodians said, *"That* [training] *lets you know more how to take care of yourself. To not know where it* [asbestos] *is, to not be told, then you're in danger all the time."*

8.2 Curriculum of Training

The second question in Research Area 6 was, "What topics were included in this training?" This topic was researched through in-person interviews with AHERA designated persons and focus group discussions with maintenance and custodial personnel.

Survey Results

The survey of AHERA designated persons asked several different questions about the content and location of the training offered to maintenance and custodial workers. While few ADPs consulted their written records before answering these questions (they were not asked to do so), there is no reason to believe that there was a systematic bias in responses.

Answers to the question, "Was the most recent asbestos-related training for maintenance workers/custodians conducted at the school or off site?" are presented in Table 8-6. Location could be considered an important factor in the adequacy of AHERA training. If training includes a description of where ACBM is located in a building and is perhaps augmented by a building reinspection to point out locations, then training on site is desirable. On the other hand, if clear building-specific training materials are included in a course, training a person away from the site could be adequate.

Table 8-6. Percent of schools where the location of training sessions for LEA-employed maintenance and custodial workers was on site, off site, or both

Training location	Maintenance training	Custodial training
At the school	19%	24%
Off site	67%	69%
Both	1%	1%
No training offered	7%	3%
School does not have this type of employee	7%	2%
		N=83,840

Of the most recent custodial training courses offered by schools, 24 percent (± 10%) were taught at the school, while 69 percent (± 7%) were offered off site. The remainder were offered in both locations. The differences between custodial and maintenance worker training shown in Table 8-6 are not statistically significant at the 5 percent significance level.

Table 8-6 shows that 69 percent of custodians (± 7%) and 67 percent of maintenance workers (± 10%) in schools which meet the study criteria, and in which the staff are LEA employees, offer training to maintenance workers and custodians at a location other than the school. The differences between the maintenance worker and custodial percentages in the table are not statistically significant at the 5 percent significance level.

Table 8-7 shows the percent of schools in which the staff are LEA employees where maintenance worker and custodial training included a description of the locations where asbestos-containing materials were found. This table shows that up to 25 percent (± 8%) of this type of school did not show maintenance workers where ACBM was located. Similarly, up to 18 percent (± 7%) of the schools in which custodians were trained did not describe the locations of ACBM to their custodians. The differences between custodian and maintenance worker training shown in Table 8-7 are not statistically significant at the 5 percent significance level.

Table 8-7. Percent of schools where training provided to LEA-employed maintenance workers and custodians contained a description of where asbestos-containing building materials were found in the school

ACBM location described	Maintenance training	Custodian training
Training included a description of where asbestos was found	61%	76%
Training did not include a description of where asbestos was found	25%	18%
No training offered	7%	3%
School does not have this type of employee	7%	2 %
		N=83,840

Table 8-8 shows the three most common methods of describing the location of ACBM used by schools that provided training. This table is based on a subset of schools that met the study criteria and provided training to maintenance workers or custodians. These methods do not total 100 percent as schools often use more than one training method. By far the most common method of presentation was a verbal description of the locations of ACBM in the school. Ninety-two percent (± 4%) of the schools used this method in training maintenance workers, while 91 percent used it for training custodians (± 5%). The next most common method was presenting the floorplan of the building [81% (± 10%) for maintenance workers and 75% (± 11%) for custodians]. This was followed by a walkthrough of the school to point out ACBM. Approximately half of the schools provided a walkthrough to both types of workers.

Table 8-8. Percent of schools where training provided to LEA-employed maintenance workers and custodians included a description of the location of asbestos, by method of presentation

Method of presentation	Maintenance workers	Custodians
Included a building walkthrough	55%	47%
Floorplan of the building presented	81%	75%
Verbal description	92%	91%
N=	*51,902*	*63,894*

Table 8-9 shows the combinations of presentation techniques used by schools which met the study criteria and employed and trained maintenance workers or custodians. The three most frequent combinations of methods of presenting information on locations of asbestos-containing materials for both maintenance workers and custodians were:

- Building walkthrough, floorplan, and verbal description [52% (± 18%) for maintenance workers and 43% (± 15%) for custodians];
- Floorplan and verbal description [26% (± 14%) for maintenance workers and 27% (± 11%) for custodians]; and
- Verbal description only [13% (± 8%) for maintenance workers and 19% (± 10%) for custodians].

A comparison of the responses of maintenance workers and custodians in Table 8-9 shows that the relationships are not significantly different at the 5 percent significance level.

Table 8-9. Percent of schools where training presented information on locations of asbestos-containing building materials

Training method	Maintenance workers	Custodians
Building walkthrough, floorplan, and verbal description	52%	43%
Building walkthrough and floorplans	0%	0%
Building walkthrough and verbal description	1%	3%
Building walkthrough only	1%	<1%
Floorplans and verbal description	26%	27%
Floorplans only	2%	5%
Verbal description only	13%	18%
None of the above methods	4%	3%
N=	*51,902*	*63,894*

Maintenance and Custodial Worker Focus Group Results

Course content was consistent for most people. Maintenance workers who received the AHERA required level of training were told about the health effects of asbestos and presented the standard information for an awareness course. Most were shown some safety procedures to follow when working around asbestos, usually glove bag removal procedures. In one location, custodian-engineers, whose job responsibilities are like those of maintenance workers, had received extensive training prior to AHERA. These workers' post-AHERA training included little more than the history of asbestos and why and when asbestos is used. This training said little about health effects or procedures to be used around asbestos. This particular training does not appear to serve the intent of the AHERA legislation. In all cases when films, videos, or slides were used, a knowledgeable person was present to answer questions. In a few situations the location of ACBM was discussed during the training.

Most maintenance workers thought that the course content was at least adequate, and in some cases, comprehensive. As one said, *"I know enough not to handle it."* It appears that the curriculum meets the requirements outlined by AHERA, though the lack of knowledge about specific locations of ACBM suggests that training is inadequate for promoting good work practices.

Almost all of the custodians who received training were shown training movies or videotapes. However, the participants stated that they did not believe they retained much of the training information. One exception was a custodian who was shown by the AHERA designated person what asbestos looked like and the equipment to be used around it. Custodians were aware of asbestos, but they felt they did not know enough about health effects and how to locate the asbestos in their schools. The training curriculum appears to have created some awareness of ACBM as required by AHERA, but retention of information was poor and the custodians expressed almost a universal lack of knowledge about asbestos. In fact, many of the custodians worked around ACBM and reported having to disturb/clean ACBM. These workers did not receive 16 hours of training as required for these activities.

Approximately half of the maintenance workers received training on respirator use, learning how to perform positive and negative pressure testing. None of these people were fit tested by the Occupational Health and Safety Administration (OSHA) definition of the term, and virtually none met OSHA's medical examination and other requirements for respirator use. No custodians, whatever their responsibilities around ACBM, reported having received either respirator training or access to a respirator.

8.3 Tasks Required of Maintenance and Custodial Workers

The third question in Research Area 6 was, "What tasks relative to asbestos or suspect ACBM are regularly required of maintenance and custodial workers, and do these tasks correspond to the level of training received?" This topic was researched solely through focus group discussions with maintenance and custodial personnel.

Maintenance and Custodial Personnel Focus Group Results

Maintenance and custodial workers frequently performed similar tasks. A series of questions about specific situations involving asbestos were posed to the group participants.

The first question dealt with cleaning up after a roof leak had damaged asbestos. Well over half of the workers had cleaned up after roof leaks, but only a few knew whether or not asbestos had been damaged. In one case, a maintenance worker used what he called glove bag procedures (though this would not be an approved cleanup procedure for this type of leak). In another, a custodian cleaned up using standard dry cleaning procedures even though co-workers had told her earlier that asbestos was present. In general, no special procedures were followed in this situation. This is because a roof leak is usually considered a cleaning and maintenance emergency (not an ACBM emergency). The goal was to deal with these incidents immediately, especially if children were present.

The second question involved working above ceiling tiles where asbestos was located. Less than half of the participants performed tasks in this situation. No special procedures were followed and, when it was known that asbestos was present, the situations were usually viewed as emergencies and work was performed in spite of the presence of ACBM. A few maintenance workers were aware of asbestos in this situation and stated that they *"stayed away"* from any ACM. However, these few did remove ceiling tile and worked above the tile where ACM was present.

The third question dealt with cleaning in a boiler room where asbestos was located. Approximately one-third of the participants cleaned areas in boiler rooms where asbestos was present. A few workers used special procedures or protection such as suits, respirators, or controlled disposal. However, the other workers did not follow any special procedures, sometimes wet mopping the area and sometimes, dry sweeping and dusting.

The fourth question dealt with working where a pipe insulated with asbestos had leaked, damaging less than three linear feet of asbestos-containing material. This situation occurred in three focus group locations. In one, appropriate procedures were followed in most cases. However, in one school special crews that came in to repair the damage created additional damaged ACBM and did not clean up. Maintenance workers sometimes repaired insulation but simply threw it away, without following any recommended disposal procedures. One custodian reported cleaning up a pipe leak; when a plumber was called, he would not touch the pipe because it was insulated with ACBM. Focus group participants in several locations reported that ACBM cleanup or repair was performed by a special LEA-employed asbestos team. This study did not attempt to collect data on the training or activities of these teams.[2]

There were no cases of greater than three linear feet of ACBM being damaged or repaired.

Other types of jobs were performed around asbestos, most of which concerned vinyl asbestos tile (VAT). VAT is dry buffed in many schools and situations, although in a few cases, appropriate procedures were followed in buffing the tiles. In most cases when the tile is damaged and crumbling, it is picked up and thrown away, though as friable ACBM, it should be disposed of in an authorized way. Several participants who reported having removed VAT without using any special procedures believed their use of heat guns was good work practice.

Other jobs around asbestos include dry sweeping floors next to pipes insulated with ACBM; removing ceiling tiles; performing minor maintenance work around boilers, such as removing an asbestos insulation plug to drain the boiler; and performing plaster repair work around ACBM. In most of these cases, inappropriate techniques were used.

Much work is done around asbestos without following appropriate work procedures. In many cases this is due to what is considered an emergency situation, (not an asbestos emergency, but a maintenance emergency). In other cases it is because workers have not been told the appropriate procedures or whether or not the material contains asbestos. One participant said, *"They call you in; you don't know what you're getting into,* [or] *how to prepare for it."*

We found in the focus groups that many maintenance and custodial workers were concerned about the security of their jobs if they *"say anything about asbestos"* or take the time to follow appropriate working practices around asbestos. Nevertheless, only one of the maintenance workers, and no custodial worker, claimed to have faced the loss of his/her job over asbestos issues.

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[2] The statistical samples used for this evaluation were representative at the school and building level. They were not representative at the LEA level. For this reason, studying team activities at the LEA level was not practical.

Several maintenance workers have respirators available, but only in a few cases have they been used. In some cases, the respirators are available for anyone to use, and in others they are assigned to one person. None of the respirators issued meet OSHA standards for fit testing or administrative controls for issuance.[3] In one school system, maintenance workers obtained school funds and purchased respirators. Even among those who have been issued respirators, most maintenance workers have chosen not to use one.

A majority of the maintenance workers were aware of Management Plans. Several had either used their school's Plan to determine the location of ACBM or had simply familiarized themselves with the content. Some found the Plans difficult to work with, while others found them to be relatively easy to understand. In contrast to maintenance workers, only a few custodians were aware of a Management Plan. One person thought there might be an Operations and Maintenance plan specific to his school in a Management Plan. The other participants followed what they considered a verbal O&M plan when special precautions were taken around ACBM.

Maintenance and custodial staff reported that not all school areas with ACBM were labeled. In particular, they were concerned that a label does not show clearly which material in an area contains asbestos.

The maintenance and custodial workers who participated in these groups had a strong sense of pride in their jobs, especially as related to providing a safe and clean environment for the children. They were all concerned about the children's safety, perhaps in many cases more than their own.[4] There is a sense of frustration and fear in some cases of not knowing whether or not what they are doing on a daily basis is hurting or helping reduce risk to the school population. In some cases, if a task requiring contact with ACBM was brought to a supervisor's attention, it was handled appropriately. In many more cases, there was concern for job security.

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[3] All respondents were asked if they were "fit tested" (the OSHA fit testing process was described during the group) and none had been. In some cases maintenance workers were responsible for purchasing their own filters and had purchased non-asbestos filters. For more detail on this, see Appendix C.

[4] See Appendix C for detail on this issue.

8.4 Summary

Chapter 8 has responded to questions involving maintenance worker and custodian training and responsibilities in the wake of AHERA. The ADPs reported that 87 percent (± 9%) of maintenance workers and 95 percent (± 6%) of custodians are trained by schools., However, 78 percent (± 5%) of maintenance workers are trained for less than the 16 hours called for by AHERA for workers who work around or disturb ACBM, and some are not trained at all. By contrast, only 5 percent (± 6%) of custodians are trained for less than the two hours required by AHERA for awareness training. However, if custodians work around or disturb ACBM, 88 percent (± 8%) have received less than 16 hours of training and some have received no training. Each of these relationships is statistically significant at the 5 percent significance level.

The ADP and maintenance and custodial worker interviews sometimes presented different opinions. In general, ADPs told of training promptly given, though frequently shorter than AHERA stipulates for staff who work directly with asbestos. They also told of training that included extensive and often multiple presentation of the locations of ACBM.

By contrast, several focus group participants did not remember being trained or, if they did remember, felt that it was no more than "*showing a video*." The untrained workers, and some of the trained workers, also expressed concern about not knowing where ACBM was located in their schools, or how to handle it properly.

The focus group results show that the majority of maintenance workers received the 16-hour AHERA-specified training, and most custodial workers have received a two-hour awareness training. Curricula were generally consistent for both groups. The participants in these five focus groups appeared to be aware of asbestos. However, quite a few did not know much about it or where it was located in their schools. Most wanted more information and training, especially about health effects and how to recognize asbestos. While the training that is provided appears to meet the requirements of AHERA for maintenance workers, most custodians who work with ACBM did not receive 16 hours of training. A significant number of participants felt that they lacked the knowledge and information they needed to do their jobs safely. The larger issue is that not all maintenance and custodial workers are being trained as required by AHERA.

The final questions in this Research Area relate to tasks maintenance workers and custodians perform in contact with ACBM. Although the length of training appears adequate for both types of workers, the focus group findings show that frequently unprotected and inappropriate work practices are used in schools in the five communities in which focus groups were held. On the whole, these inappropriate work practices were performed while cleaning up fiber release episodes of less than 3 linear or square feet, or as routine maintenance/custodial activities. Because the workers are unaware that a material might contain asbestos, because of inadequate or no training, or because of pressure to act immediately in an "emergency" situation, it is almost certain that exposure to asbestos is occurring and appropriate procedures are being followed in only a few cases. Most workers did not express concern that they disturb asbestos and creating a health hazard when they removed suspended ceiling tiles or brushed against insulated pipes. ACBM was seen as being disturbed only when it was sawed, cut, or in some other way visibly damaged.

Respirators were unavailable to custodians and, when available to maintenance workers, were often shared. Respirators were rarely used even when available .

9. ADDITIONAL RESEARCH FINDINGS

Chapters 3 through 8 of this final report describe the findings of the evaluation stemming from the six research areas specified by the EPA. As Westat performed the data analysis for these research areas, however, three additional findings emerged. The first of these areas emerged from an analysis of the results of the screener questionnaire and sheds some light on possible levels of compliance with AHERA in schools nationwide. The second area involves the types of clearance air monitoring tests used by schools that have a Management Plan. The third area concerns the current condition of ACBM in schools.

9.1 Possible Compliance with AHERA

Chapters 3 through 8 report findings on how well LEAs, and the inspectors and Management Planners they hired, have complied with AHERA, given they attempted to comply. We now turn to estimation of the number of LEAs that did not attempt to comply with AHERA. Data for this estimation come from the telephone screening interview with 1,041 ADPs, conducted primarily to determine the school's eligibility for the study. As such, the data indicate only possible noncompliance as inferred from the ADPs' responses. We have no direct proof of deliberate noncompliance by any LEA.

The structure of the screening questionnaire required terminating questions about a school or school building as soon as a negative answer was given. A negative answer indicated that the school or school building was ineligible. The questionnaire was structured as follows:

School questions[1]

1. Does the school currently have classes in any of grades 1-12?
2. Does the school have an asbestos Management Plan?

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[1] Asked for each school in the screener sample.

202

Building Questions[2]

3. Was the building built before October 1988?

4. Has the building been inspected for asbestos since December 1987?

As previously noted, a "No" answer to any of these questions stopped the interviewer from asking any additional questions about the school for school-level questions, or about the building for building-level questions. Questions 1 and 3 do not relate to a school's compliance with AHERA; however, negative answers to Questions 2 and 4 indicate possible noncompliance with AHERA. Table 9-1 shows the weighted frequency of answers to these questions and the percent of schools not contacted at the screener stage, the percent of schools refusing to participate in the screener, and the percent eligible for the study.

Table 9-1. Estimated national percent of schools with selected responses to screening interview

Schools	Reported percent of schools
Not contacted	4%
Refusal at screener	6%
No Management Plan	1%
Building not inspected	
Some	3%
All	1%
Eligible	72%
Refused inspection	17%[1]
Ineligible for reasons not associated with compliance	14%

[1] This is an unweighted percent. As such, it is the percentage in the sample, not the estimated national percent.

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[2] Asked for each building the ADP told us was at the school.

A lower bound for the incidence of possible noncompliance can be constructed from the data in Table 9-1. An estimated 4 percent of schools nationally are out of compliance with AHERA because they have not prepared a Management Plan or have not inspected all of their school buildings for ACBM. This is a low estimate of possible noncompliance because noncontacted schools and schools that refused at the screener stage are not included. These two types of noncompliance together account for 10 percent of all schools, and we can assume that an unknown nonzero percentage of these schools have not complied with AHERA. Moreover, while we assume that most respondents answered our questions honestly and accurately, only 76 percent of schools we invited to participate in the evaluation did so. Reasons for refusal include a stated lack of staff to allow us to visit. Other schools that refused were in LEA's with several other schools in the study, and these schools may have decided that their LEA had "done enough for the evaluation". It is also possible, however, that some schools that refused when invited to participate in the study, had not complied with either the inspection or Management Plan preparation aspect of the AHERA regulation.

Table 9-2 presents four estimates for the overall rate of noncompliance with the Management Plan and inspection portions of AHERA. The estimates vary in their underlying assumptions about the extent of noncompliance with AHERA among the noncontacts, screener refusals, and inspection refusals. The lowest estimate is the 4 percent discussed above; it assumes that all noncontacts and refusals are in compliance. This estimate increases to 7 percent if the percent of schools out of compliance with this aspect of AHERA is assumed to be the same in not contacted and refusal schools as it was in the rest of the population. A mid-level estimate of 17 percent noncompliance with inspection and Management Plan components of AHERA follows from assuming that half of the not contacted schools and schools that refused at the screener and field stages are not in compliance. The upper bound estimate is set by assuming that all of the schools not contacted, refusals at the screener stage, and all of the refusals at the field stage are not in compliance with these elements of AHERA. Our estimate of this upper bound is 31 percent.

Table 9-2. **Estimates of noncompliance with the Management Plan and inspection portions of AHERA under various assumptions**

Assumption	**Percent of schools estimated**
Noncontacts and refusals at screener--all in compliance	4%
Noncontacts and refusals at screener and field stages--in compliance at same rate as other screener schools	7%
Noncontacts and refusals at screener and field stages--half not in compliance	17%
Noncontacts and refusals at screener and field stages--all not in compliance	31%

We cannot determine from the data generated for the AHERA screening which of these estimates is most accurate. Nor can we assign confidence intervals to these estimates. Nevertheless, it is possible that the best estimate is somewhere in the middle of the range, perhaps between 7 and 17 percent.

9.2 Clearance Air Monitoring Tests Performed

Table 9-3 presents our findings on the types of air sampling presented in the estimated 15,614 Management Plans that presented this type of finding. The two types of air-sampling analyses addressed in AHERA are Transmission Electron Microscopy (TEM) and Phase Contrast Microscopy (PCM). TEM is more costly than PCM, but is superior to PCM in identifying and quantifying airborne asbestos.

Table 9-3. Percent of Management Plans that contained air sampling results that used Transmission Electron Microscopy (TEM) and Phase Contrast Microscopy (PCM) for their tests

Test method	Yes	No
TEM	8%	91%
PCM	95%	5%
	N = 15,614	

This table shows that 8 percent of schools presenting air clearance results have performed TEM. Some schools have used both methods during multiple remediations. AHERA, however, phased in the use of TEM between 1987 and 1990 based on size of the project and date of abatement. Without this additional information, conclusions on the rate of compliance with regard to the TEM requirement cannot be drawn.

9.3 Current Assessment of Suspect Material in Schools

This section presents findings on the assessment of the asbestos in schools at the time of the reinspections in Spring 1990. During the reinspection of schools for the AHERA evaluation, the condition of each suspect material was assessed. This assessment placed each material into the seven assessment categories specified by AHERA. In addition, Westat divided AHERA categories 1 and 4 into two subcategories each (1a, 1b, 4a, and 4b) to differentiate between damaged and significantly damaged ACBM. Differentiation between damaged and significantly damaged surfacing materials is made in AHERA categories 2 and 3. This more detailed assessment strategy will be called the **expanded 1-7 AHERA assessment categories.** The expanded categories are as follows:

1. Damaged or significantly damaged TSI ACBM.
    - 1a. Damaged TSI ACBM.
    - 1b. Significantly damaged TSI ACBM.
2. Damaged friable surfacing ACBM.
3. Significantly damaged friable surfacing ACBM.

4. Damaged or significantly damaged friable miscellaneous ACBM.
    - 4a. Damaged friable miscellaneous ACBM.
    - 4b. Significantly damaged friable miscellaneous ACBM.
5. ACBM with potential for damage.
6. ACBM with potential for significant damage.
7. Any remaining friable ACBM or friable suspected ACBM.

The assessment protocol developed for this evaluation called for an assessment of each suspect material in each area where it was encountered. The following questions were answered in conducting each assessment:

- Is the material friable?
- Which of the following best describes its current level of local damage; <1%, 1-25%, or >25%?
- Which of the following best describes its current level of dispersed damage; <1%, 1-10%, or >10%?
- Is there a potential for water damage?
- Is there a potential for damage because this is a general access area?
- Is the potential for damage through maintenance access low or high?
- Is the potential for damage through air velocity none, low, or high?
- Is the potential for damage through the effects of vibration low or high?

Each possible combination of answers to these questions, in combination with specification of the material category (TSI, surfacing, or miscellaneous), leads to both an AHERA 1-7 category and an expanded category. For example, suppose 1 to 25 percent of the area of a miscellaneous friable material is locally damaged and that <1 percent of the area has dispersed damage. Then it is in AHERA assessment category 4 and expanded category 4a. If, instead, the <1 percent of the area of the material has both local and dispersed damage and there is no threat of damage from water, or because it is a general access area, has only a low potential for damage through maintenance activity, and only a low risk of damage through air velocity or the effects of vibration on the material, it is in AHERA category 7. Appendix H contains tables that show how assessment scores were assigned to each combination of responses.

Using the method described in the introduction to Chapter 3, each suspect material discovered in the reinspection was compared with the materials discovered at the time of the original AHERA inspection. Westat then determined if each material was ACBM. Table 9-4 shows the quantity of ACBM in thousands of square and linear feet, as appropriate, in each of the AHERA categories at the time of the reinspection. It also shows the quantity in each expanded category. Table 9-5 presents the corresponding percentages. The "Not applicable" rows in Tables 9-4 and 9-5 refer to material not assessed because it was non-friable.

Table 9-4 shows that categories 4 and 6 had the largest number of square feet of ACBM. Category 4 (damaged or significantly damaged friable miscellaneous ACM) has 231 million square feet of ACBM. Category 6 (ACBM with potential for significant damage) had 237 million square feet. Most material in category 4 was in expanded category 4a (damaged friable miscellaneous ACM). Category 6 includes such potentially large quantities of miscellaneous material as floor and ceiling tile in schools.

Table 9-5 looks at the categories into which ACBM fall at the time of reinspection. This table shows that, overall, 6 percent of ACBM measured in square feet (3% of TSI, 1% of surfacing, and 2% of miscellaneous) was, at the time of reinspection, significantly damaged. It also shows that just over 8 percent of ACBM (<1% of TSI, and 8% of miscellaneous) measured in square feet was, at the time of reinspection, in damaged condition. Too little surfacing material was damaged to accurately estimate this percent.

Table 9-4. Amount of ACBM material in each AHERA category at time of reinspection, by material type and unit of measurement

	AHERA category	Amount of ACBM materials (000)						
		Quantity in linear feet			Quantity in square feet			
		Miscellaneous	Thermal system insulation	All materials	Miscellaneous	Surfacing	Thermal system insulation	All materials
1	Damaged or significantly damaged TSI ACBM		24,693	*24,693*			63,006	*63,006*
1a	Damaged TSI ACBM		12,632	*12,632*			3,417	*3,417*
1b	Significantly damaged TSI ACBM		12,061	*12,061*			59,589	*59,589*
2	Damaged friable surfacing ACBM					–		--
3	Significantly damaged friable surfacing ACBM					13,694		*13,694*
4	Damaged or significantly damaged friable miscellaneous ACBM	–		--	231,299			*231,299*
4a	Damaged friable miscellaneous ACBM	–		--	182,531			*182,531*
4b	Significantly damaged friable miscellaneous ACBM	–		--	48,768			*48,768*
5	ACBM with potential for damage	–	13,843	*13,843*	144,147	19,760	5,124	*169,031*
6	ACBM with potential for significant damage	–	20,928	*20,928*	206,428	17,678	12,928	*237,034*
7	Any remaining friable ACBM or friable suspected ACBM		--	--			--	--
	All categorized materials	--	*59,567*	*61,104*	*581,874*	*57,945*	*81,344*	*721,162*
	Not applicable	–		--	1,486,351	11,255		*1,497,665*
	All materials	--	*59,567*	*61,104*	*2,070,795*	*69,200*	*81,344*	*2,221,339*

– The sample size was too small for reliable estimation.

A blank indicates an empty cell.

Note: Percentages may not add exactly to 100%, due to rounding.

Table 9-5. Percent of ACBM material in each AHERA category at time of reinspection, by material type and unit of measurement

		Percent of ACBM materials						
		Quantity in linear feet			Quantity in square feet			
	AHERA category	Miscellaneous	Thermal system insulation	All materials	Miscellaneous	Surfacing	Thermal system insulation	All materials
1	Damaged or significantly damaged TSI ACBM		41%	40%			77%	3%
1a	Damaged TSI ACBM		21%	21%			4%	< 1%
1b	Significantly damaged TSI ACBM		20%	20%			73%	3%
2	Damaged friable surfacing ACBM					–		--
3	Significantly damaged friable surfacing ACBM					20%		1%
4	Damaged or significantly damaged friable miscellaneous ACBM	–		--	11%			10%
4a	Damaged friable miscellaneous ACBM	–		–	9%			8%
4b	Significantly damaged friable miscellaneous ACBM	–		--	2%			2%
5	ACBM with potential for damage	–	23%	23%	7%	29%	6%	8%
6	ACBM with potential for significant damage	–	35%	34%	10%	26%	16%	11%
7	Any remaining friable ACBM or friable suspected ACBM		–	--			--	--
	All categorized materials	--	100%	100%	28%	84%	100%	32%
	Not applicable	--		--	72%	16%		67%
	All materials	--	100%	100%	100%	100%	100%	100%

– The sample size was too small for reliable estimation.

A blank is an empty cell.

Note: Percentages may not add exactly to 100%, due to rounding.

10. STATISTICAL PROPERTIES OF THE SAMPLE

10.1 Response Rates for the AHERA Evaluation

10.1.1 Building Access Results

The sampling protocol for the AHERA evaluation was described briefly in Chapter 2 and is described in more detail in Appendix G, Section G.1.1. Chapter 2 explained that the sample of schools and buildings for AHERA was selected in several stages. PSUs were selected at the first stage; an initial screening sample of schools was selected within the sampled PSUs at the second stage; a primary sample of schools was selected from eligible schools after screening at the third stage; and buildings were selected from participating schools at the fourth stage. Table 10-1 summarizes the participation status of the schools in the screener and primary samples.

Table 10-1. Participation status of schools in the sample

Stage of sampling	Total schools	Eligible schools	Ineligible schools	Refusing schools	No contact schools
Screener sample	1,041	750	193	63	35
Primary sample	200	151	1	48	0

Note that one school in the primary sample was ineligible (because it did not contain any of grades 1 through 12), even though it had been screened as eligible. In the AHERA evaluation, substitutes were identified to replace 47 of the 48 refusing schools in the primary sample, for a final sample of 198 schools. Substitutes were taken from the same PSU or PSU/remediation status category as the original selection; there was no available substitute in one case. Either one or two buildings were selected from each participating school, for a total of 207 sampled buildings.

The same sample of schools and buildings was used in several Research Areas. For Research Area 4 and part of Research Area 5, information about the sampled schools was collected from a subset of parents, teachers, and original inspectors. Table 10-2 shows the number of sampled schools providing useable data for Research Area 4 and part of Research Area 5.

Table 10-2. Final completion status for schools in Research Area 4 and Research Area 5

Research Area	Total	Useable	Unable to locate	Refused	No potential respondent named	Ineligible	Deceased
4-Original Inspectors	198	134	58	4	1	0	1
5-Parent Notification	198	157	27	1	10	3	0
5-Teacher Notification	198	164	19	5	6	4	0

The "refused" cases for Research Area 5 are those in which the principal declined to supply names of potential parent and teacher respondents during the interview. The "no potential respondent named" cases are those in which no parent and teacher names were received after the interviewer left postcards with the principal for this purpose. Finally, the "ineligible" cases in Research Area 5 were parents or teachers who were not involved with the school during the time of asbestos notification.

Nonresponse may occur at any stage of sampling and is different for each Research Area. The overall response rate for a given Research Area is the product of the response rates at each stage of sampling. Substitute schools are not considered as responding when determining the response rate. With this in mind, the response rates for the different Research Areas in the AHERA evaluation are given in Table 10-3.

The response rate is one indicator of the potential quality of the data. To the extent that nonresponding schools are different from responding schools, estimates produced from the data are potentially biased and may not accurately reflect the characteristics of the population. In the next section, we will compare the distribution of the responding and nonresponding schools at each stage of sampling, to judge how well our sampled schools represent the overall school population.

Table 10-3. Response rates for AHERA (%)

Research Area	Screener sample	Primary sample	Building sample	Original inspector, parent, or teacher sample	Overall
1-Building Reinspection	91%	76%	100%	x[*]	69%
2-Management Plan Evaluation	91%	76%	x	x	69%
3-Response Action Evaluation	91%	76%	100%	x	69%
4-Original Inspectors	91%	76%	x	68%	47%
5-Principals	91%	76%	x	x	69%
5-Parents	91%	76%	x	79%	55%
5-Teachers	91%	76%	x	83%	57%
6-Maintenance and Custodial Workers	91%	76%	x	x	69%

[*] X means this category of response did not occur.

10.1.2 Potential for Bias

Table 10-4 summarizes the numbers of sampled schools at each stage of sampling by Census region, urbanicity, type of control, and enrollment size class. The table offers descriptive information only. Comparing the different stages of sampling (i.e., different columns in the table) is inappropriate. In fact, differences are expected for three reasons:

1) Schools were not selected with equal probability at the screening stage or the primary sampling stage. An equal probability sample was attempted during screening but was not attained in some of the small PSUs. This means that schools with different demographic characteristics were selected at different rates, which causes the proportion of schools in a given category to vary at each stage of sampling. For example, note that rural schools account for 37 percent of the universe but only 21 percent of the screener sample. This is partly due to the fact that rural schools were sampled at lower rates than urban and suburban schools. As another example, note that private schools account for 9 percent of the eligible schools but only 3 percent of the primary sample. Due to the limited sample size and the importance of controlling for other variables during sampling, type of control was not a controlling variable when selecting the primary sample. Thus private schools were sampled at a lower rate than other types of schools.

Table 10-4. The schools in the AHERA evaluation by certain demographic variables at various stages of sampling

Characteristic	QED Universe counts		Screener sample		Elig. After screening		Primary sample		Final sample	
	N	%	N	%	N	%	N	%	N	%
Census region:[1]										
Northeast	20,178	19	204	20	159	21	48	24	47	24
South	33,284	32	380	36	272	36	68	34	68	34
Midwest	30,529	29	282	27	201	27	54	27	54	27
West	21,810	21	175	17	118	16	30	15	29	15
	105,801	**100**	**1041**	**100**	**750**	**100**	**200**	**100**	**198**	**100**
Urbanicity:										
Urban	25,750	24	321	31	222	30	66	33	65	33
Suburb[illegible]	41,203	39	500	48	370	49	92	46	92	46
Rural	38,848	37	220	21	158	21	42	21	41	21
	105,801	**100**	**1041**	**100**	**750**	**100**	**200**	**100**	**198**	**100**
Type of control:										
Public and other	81,956	78	778	75	611	82	171	86	169	85
Catholic	9,009	8	95	9	70	9	23	12	23	12
Private	14,836	14	168	16	69	9	6	3	6	3
	105,801	**100**	**1041**	**100**	**750**	**100**	**200**	**100**	**198**	**100**
Enrollment size class:										
<300	45,448	43	426	41	258	34	62	31	59	30
300-999	53,000	50	535	51	426	57	119	60	121	61
1,000 +	7,353	7	80	8	66	9	19	10	18	9
	105,801	**100**	**1041**	**100**	**750**	**100**	**200**	**100**	**198**	**100**

[1] **Northeast:** ME, VT, NH, MA, CT, NY, PA, NJ, RI
South: MD, DE, DC, WV, VA, KY, NC, TN, AR, OK, TX, LA, MS, AL, GA, SC, FL
Midwest: ND, MN, WI, MI, SD, IA, IL, IN, OH, NE, KS, MO
West: WA, ID, MT, OR, WY, CA, NV, UT, CO, AZ, NM, AK, HI

2) Thirty PSUs were sampled before selecting the schools for screening. The difference between the universe counts and the screener sample reflects, in part, the kinds of schools in the selected PSUs.

3) Schools had different rates of eligibility for the AHERA evaluation depending on their demographic characteristics. For instance, public schools and medium-sized schools tended to be eligible more often than other types of schools. On the other hand, private schools and small schools tended to be ineligible more often than others.

These issues are directly related to the sampling methods used in the AHERA evaluation. They represent the tradeoffs that one must make among cost, precision, and bias when designing and implementing any research effort. While these issues may affect the sampling errors associated with the results of the AHERA evaluation (see Section 10.2.3), they do not induce a potential bias. In fact, the sampling methods used for the evaluation are unbiased with one possible exception. Not all private schools are included in the QED file used for sampling. Because the excluded private schools represent only about two percent of all schools in the nation, this exclusion is unlikely to cause substantial bias. In addition, private schools tend to be small and therefore do not account for a large part of the total ACBM present. We now look at the potential for nonresponse bias in the AHERA evaluation.

Table 10-5 compares the distribution of the responding and nonresponding schools in the primary sample. The distribution of the nonresponding schools is not significantly different from that of the responding schools for any of the demographic characteristics shown in the table. Although the final sample includes 47 substitute schools, it is comparable to the primary sample on Census region, urbanicity, type of control, and enrollment size class. The nonresponse bias in the final sample will be reduced by the extent that these characteristics are related to the estimates produced by the AHERA evaluation, and the extent that the nonresponding schools are similar to the responding ones on the data items collected.

While it is impossible to determine the exact nature and size of the bias due to nonresponse, it is possible, via sensitivity analysis, to estimate the potential size of the bias. Some of the 48 refusals in the primary sample responded to the requirements of AHERA in the same manner as the 151 responders; on average they have the same quality or better inspections, Management Plans, response actions, etc. Other refusals have poorer quality inspections, Management Plans, etc. It is impossible to determine how many of the refusals belong to each group. However, we can estimate the effect of different breakdowns on the estimates presented in

Chapters 3 through 9. For example, Chapter 5 reports that 29 percent of schools had no response actions recommended in their Management Plans. This represents approximately 44 of the 151 responding schools in the primary sample. If we assume that twice as many of the nonresponders had no response actions recommended (including some who may not even have a Management Plan), then we would have found 28 such schools, had we been able to inspect the refusing schools. Combining the respondents and refusers, the 29 percent becomes 36 percent.[1] If, instead, we assume none of the refusals have response actions, then the 29 percent would become 46 percent.

For a second example, Chapter 8 reports that 95 percent of schools offered asbestos-related training to their custodians since October 1987. If we assume only half the refusers offered such training to their custodians, then the 95 percent drops to 84 percent, still a large majority. If we make the extreme assumption that none of the refusers trained their custodians, then the 95 percent drops to 72 percent. This analysis suggests that the potential bias due to nonresponse may have moderate effects on the reported statistics. However, it is unlikely to have large effects on the reported statistics. The nonresponse bias has less potential impact on reported amounts of material than on reported percentages, because the refusers tended to be smaller schools than responders. In addition, note that the final sample described above includes the responding schools for most Research Areas, but not all of these schools had useable data for Research Area 4, Research Area 5-parents, and Research Area 5-teachers. Thus there is increased potential for bias in these Research Areas.

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[1] For simplicity, this sensitivity analysis ignores weighting. This has the effect of changing the computed percentages somewhat, but leaving the conclusions intact.

Table 10-5. The schools in the primary sample by response status and selected demographic variables

Characteristics	Primary sample responding N	Primary sample responding %	Primary sample non-responding N	Primary sample non-responding %
Census region:[1]				
Northeast	34	22	14	29
South	53	35	15	31
Midwest	41	27	13	26
West	23	15	7	14
	151	**100**	**49**	**100**
Urbanicity:				
Urban	51	34	15	31
Suburban	72	48	20	41
Rural	28	18	14	29
	151	**100**	**49**	**100**
Type of control:				
Public and other	127	84	44	90
Catholic	22	15	1	2
Private	2	1	4	8
	151	**100**	**49**	**100**
Enrollment size class:				
<300	41	27	21	43
300-999	97	64	22	45
1,000 +	13	9	6	12
	151	**100**	**49**	**100**

[1] Northeast: ME, VT, NH, MA, CT, NY, PA, NJ, RI
South: MD, DE, DC, WV, VA, KY, NC, TN, AR, OK, TX, LA, MS, AL, GA, SC, FL
Midwest: ND, MN, WI, MI, SD, IA, IL, IN, OH, NE, KS, MO
West: WA, ID, MT, OR, WY, CA, NV, UT, CO, AZ, NM, AK, HI

10.2 Methodology for Weighting, Imputation, and Variance Estimation

10.2.1 Weighting Methodology for the AHERA Evaluation

As we stated in Section 2.1, schools were selected for inclusion in the AHERA evaluation in three stages. Thirty PSUs were selected at the first stage, 1,041 schools were selected for screening at the second stage, and 200 schools were selected from those eligible after screening at the third stage. In addition to this final sample of 200 schools, backup and replacement samples were selected to allow substitutions of nonresponding schools if necessary. The AHERA evaluation is composed of six distinct Research Areas which study issues at either the school or building level. One or two buildings were selected from each of the final, backup, and replacement schools to facilitate work in the Research Areas with building level analyses. In some cases, buildings were later resampled in the field.

In probability sampling like that used to select the schools and buildings for the AHERA evaluation, weighting the sample is intended to accomplish two ends. First, sample weights reflect the fact that not all schools and buildings participating in the evaluation studies were sampled with the same probability. Second, sample weights reduce bias by compensating for differing patterns of nonresponse. If responders and nonresponders were alike with respect to the study objectives, then weighting would eliminate nonresponse bias. If responders and nonresponders are different, then weighting will only reduce biases. Estimates based on weighted data apply to the population from which the sample was drawn, while estimates based on unweighted data describe only the sampled units. The data for each of the six Research Areas in the AHERA evaluation were weighted using the procedures explained in Appendix G.

10.2.2 Imputation for the AHERA Evaluation

There are usually two kinds of nonresponse in a survey. **Case nonresponse** occurs when potential respondents do not provide any useable data. These respondents may not participate in the survey at all. Or, they may appear to participate but not provide any useable data, for example, by choosing "Don't know" for every item. On the other hand, **item nonresponse** occurs when respondents complete most of the survey except for a few items.

Sample estimates are usually adjusted to compensate for both kinds of nonresponse so that they more accurately reflect the corresponding population totals. Case nonresponse is generally handled during data weighting. Potential respondents are grouped into cells based on variables thought to be related to the estimates of interest. Then the responding cases are used to represent nonresponding cases within each cell. For example, suppose that 40 schools were selected from a PSU to be in a national study, but only 30 participated. Assuming that the schools were selected with equal probability, estimates based on the 30 schools would be multiplied by 1.33 (40/30) to account for the nonresponding schools in that PSU. Similar adjustments would be made in the remaining PSUs so that estimates produced from all responding schools would reflect the corresponding values for entire country. The extent of case nonresponse in the AHERA evaluation and the weighting procedures used to compensate for it are described in Sections 10.1.1 and 10.2.1, respectively.

To compensate for item nonresponse in surveys, the missing data are often imputed during the analysis stage. Two commonly used methods of imputation are "cold deck" and "hot deck". Cold deck methods use outside information from previous surveys to impute for missing items. Hot deck methods use the information available from the current sample. In general, hot deck methods were used in the AHERA evaluation. Some questionnaire items needed no imputation. When performed, the amount of imputation ranged from less than 1 percent to 18 percent for a given item. A detailed description of the imputation methods used in the AHERA evaluation is contained in Appendix G.

10.2.3 Variance Estimation and Confidence Intervals

The statistical findings of the AHERA evaluation are estimates based on a statistical sample of schools selected from the population of eligible schools across the country. Statistics calculated from samples will rarely be exactly equal to the corresponding population values. For example, the sample mean is not likely to be exactly equal to the population mean. The differences between sample results and the corresponding population values are called sampling errors and may be quantified by calculating standard errors and confidence intervals. Thus, standard errors and confidence intervals give information about the likely magnitude of the difference between the sample estimate and population parameter. Confidence intervals for means, totals, and percentages are typically calculated as the estimated mean, total or percentage, plus or minus two times the standard error of the estimated mean, total, or percentage. This formula yields approximately 95 percent confidence intervals, which may be interpreted as follows:

> In repeated sampling from the same population using the same methods, 95 percent of the samples will result in confidence intervals that contain the population parameter. Five percent of the samples will result in confidence intervals that miss the estimated parameter.

Intervals with varying levels of confidence may be constructed by multiplying the standard error by statistically derived factors. For example, a 90 percent confidence interval is calculated as the sample estimate plus or minus 1.6 times the standard error.

Sampling errors are often presented in relative terms by using the coefficient of variation (CV). The CV is the standard error of an estimate divided by the estimate. It expresses the standard error in relative terms without regard to the magnitude of the statistic itself. For example, consider the hypothetical results below:

Statistic of Interest	Sample Estimate	Standard Error	95% Confidence Interval	CV (%)
Total square feet of ACM found in schools nationwide	20,000,000	450,000	19,100,000 to 20,900,000	2.25
Percent of schools nationwide that found any ACM	70	3	64 to 76	4.29

The first confidence interval seems less precise than the second, i.e., exhibits greater relative variability, because the numbers involved are so large. However, note that the coefficient of variation in the first case is 2.25 percent, versus 4.29 percent in the second case. Thus, the estimate for the first statistic is actually more precise than the second, i.e., exhibits less relative variability. The methods used for variance estimation are described in detail in Appendix G.

EVALUATION OF THE ASBESTOS
HAZARD EMERGENCY RESPONSE ACT (AHERA)

FINAL REPORT APPENDICES

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Rockville, MD 20850

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Washington, DC 20460

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APPENDIX A

AHERA EVALUATION DATA COLLECTION FORMS

AHERA SCHOOL SCREENER

S-1. VERIFY LABEL ON FRONT PAGE BY READING TO THE AHERA DESIGNATED PERSON THE SCHOOL NAME, ADDRESS, AND PHONE NUMBER, AND THE PRINCIPAL NAME. MAKE THE NECESSARY CHANGES.

→

S-2. Does (NAME OF SCHOOL) currently have classes in any of grades 1 through 12?

YES 1
NO .... 2 (AFTER PROBING, TERMINATE AND PROCEED TO NEXT SCHOOL, IF THERE IS ONE)
DK 8

S-3. Does this school have an asbestos management plan?

YES 1
NO .... 2 (TERMINATE AND PROCEED TO NEXT SCHOOL, IF THERE IS ONE)
DK 8

←

I am going to ask you to name the buildings that make up (NAME OF SCHOOL). If (NAME OF SCHOOL) has two structures sharing an interior wall, count this as a single building. If this school has two structures connected only by above-ground or underground walkways, please count it as two separate buildings.

↓

S-4.	S-5.	S-6.	S-7.	S-8.	S-9	S-10			
Please name all buildings at (NAME OF SCHOOL). Include all permanent and temporary buildings. Feel free to refer to the school asbestos management plan, if that would be helpful. (PROBE WHEN ALL ARE LISTED: Are there any other buildings?)	Was (NAME OF BUILDING/SCHOOL) built before October 1988?	Has (NAME OF BUILDING/SCHOOL) been inspected for asbestos since December 1987?	Did the inspection discover asbestos-containing materials, or suspect ACM in (NAME OF BUILDING/SCHOOL)?	Are there students in (NAME OF BUILDING/SCHOOL) on a regular basis?	I am going to read you a list of building size categories, and ask you to classify (NAME OF BUILDING/SCHOOL) into one of them. Is the size of (NAME OF BUILDING/SCHOOL) . . .	Since December 1987, were any of the following types of asbestos remediation performed on 3 or more linear feet or 3 or more square feet of material in (NAME OF BUILDING/SCHOOL)?	YES	NO	DK
01. ____ ____ ____	YES ...... 1 } → DK ...... 8 NO ...... 2 ↓ (GO TO NEXT BUILDING)	YES .... 1 → DK ..... 8 (S-8) NO ..... 2 ↓ (GO TO NEXT BUILDING)	YES ..... 1 } → DK ..... 8 NO ..... 2 ↓ (GO TO NEXT BUILDING)	YES .... 1 } → DK .... 8 NO .... 2 ↓ (GO TO NEXT BUILDING)	a. less than 10,000 sq. ft., ... 1 b. 10,000 to 49,999 sq. ft., ... 2 c. 50,000 to 99,999 sq. ft., or 3 d. 100,000 sq. ft. or more? ... 4 e. DK .... 8 } →	a. Removal of asbestos-containing building material or building material assumed to contain asbestos ...... b. Encapsulation of asbestos-containing building material or building material assumed to contain asbestos ...... c. Enclosure of asbestos-containing building material or building material assumed to contain asbestos	1 1 1	2 2 2	8 8 8
02. ____ ____ ____	YES ...... 1 } → DK ...... 8 NO ...... 2 ↓ (GO TO NEXT BUILDING)	YES .... 1 → DK ..... 8 (S-8) NO ..... 2 ↓ (GO TO NEXT BUILDING)	YES ..... 1 } → DK ..... 8 NO ..... 2 ↓ (GO TO NEXT BUILDING)	YES .... 1 } → DK .... 8 NO .... 2 ↓ (GO TO NEXT BUILDING)	a. less than 10,000 sq. ft., ... 1 b. 10,000 to 49,999 sq. ft., ... 2 c. 50,000 to 99,999 sq. ft., or 3 d. 100,000 sq. ft. or more? ... 4 e. DK .... 8 } →	a. Removal of asbestos-containing building material or building material assumed to contain asbestos ...... b. Encapsulation of asbestos-containing building material or building material assumed to contain asbestos ...... c. Enclosure of asbestos-containing building material or building material assumed to contain asbestos	1 1 1	2 2 2	8 8 8
03. ____ ____ ____	YES ...... 1 } → DK ...... 8 NO ...... 2 ↓ (GO TO NEXT BUILDING)	YES .... 1 → DK ..... 8 (S-8) NO ..... 2 ↓ (GO TO NEXT BUILDING)	YES ..... 1 } → DK ..... 8 NO ..... 2 ↓ (GO TO NEXT BUILDING)	YES .... 1 } → DK .... 8 NO .... 2 ↓ (GO TO NEXT BUILDING)	a. less than 10,000 sq. ft., ... 1 b. 10,000 to 49,999 sq. ft., ... 2 c. 50,000 to 99,999 sq. ft., or 3 d. 100,000 sq. ft. or more? ... 4 e. DK .... 8 } →	a. Removal of asbestos-containing building material or building material assumed to contain asbestos ...... b. Encapsulation of asbestos-containing building material or building material assumed to contain asbestos ...... c. Enclosure of asbestos-containing building material or building material assumed to contain asbestos	1 1 1	2 2 2	8 8 8
04. ____ ____ ____	YES ...... 1 } → DK ...... 8 NO ...... 2 ↓ (GO TO NEXT BUILDING)	YES .... 1 → DK ..... 8 (S-8) NO ..... 2 ↓ (GO TO NEXT BUILDING)	YES ..... 1 } → DK ..... 8 NO ..... 2 ↓ (GO TO NEXT BUILDING)	YES .... 1 } → DK .... 8 NO .... 2 ↓ (GO TO NEXT BUILDING)	a. less than 10,000 sq. ft., ... 1 b. 10,000 to 49,999 sq. ft., ... 2 c. 50,000 to 99,999 sq. ft., or 3 d. 100,000 sq. ft. or more? ... 4 e. DK .... 8 } →	a. Removal of asbestos-containing building material or building material assumed to contain asbestos ...... b. Encapsulation of asbestos-containing building material or building material assumed to contain asbestos ...... c. Enclosure of asbestos-containing building material or building material assumed to contain asbestos	1 1 1	2 2 2	8 8 8

FILL IN: 1 of ☐ page(s)

PROCEED AS APPLICABLE TO: CONTINUATION SHEET, OR NEXT SCHOOL SCREENER, OR CLOSING STATEMENT IN SCRIPT.

[AFFIX LABEL HERE]

U.S. ENVIRONMENTAL PROTECTION AGENCY

AHERA EVALUATION STUDIES

FORM A1: AHERA Designated Person Interview

March 1990

Westat, Inc.
1650 Research Boulevard
Rockville, MD 20850

Start time: ____________ am / pm

AHERA
Form A1: AHERA Designated Person Interview

L1. IS THIS THE FIRST SCHOOL IN THIS LEA DISCUSSED WITH THE RESPONDENT?

YES 1
NO .... 2 [SKIP TO BOX 3]

BOX 1

Hello, (AHERA DESIGNATED PERSON'S NAME) my name is (YOUR NAME). I'm with Westat, a survey research firm near Washington, D.C. The U.S. Environmental Protection Agency has asked us to conduct an evaluation of certain aspects of the AHERA regulations. Information about each school contacted will be kept confidential, although the results of this study will be aggregated by region and sent to Congress in a report.

BOX 2

(NUMBER OF BUILDINGS SELECTED) building(s) from (SCHOOL NAME) (was/were) randomly selected for inclusion in this study. We have no reason to suspect that there are any problems associated with asbestos in (this/these) building(s).

I have come to you for information relating to asbestos management in the school. After this interview, we would like to conduct a building inspection in the school. You are welcome to participate in this inspection if you would like.

During this interview, I will be asking you questions about the school, the school buildings, the school asbestos management plan, and any asbestos response actions that may have been taken in the school. Please feel free to refer to the school's asbestos management plan at any time to answer my questions.

L2. Before we get started, I would like to be sure that we have recorded your name correctly. Is the correct spelling [SAY TITLE AND SPELL AHERA DESIGNATED PERSON'S NAME]?

YES 1
NO 2

(CORRECT SPELLING) ____________________________________

BOX 3

I'd like to start by asking you a few general questions about (SCHOOL NAME).

L3. Please classify the school into one of the following categories:

Public school?	1
Private school associated with a religion?	2
Private school not associated with a religion?	3
Another type of school?	4

(SPECIFY) ______________________________

BOX 4

Now I'd like to verify which grades will be taught during the current school year at (SCHOOL NAME). When answering this question, please give me information for the school year beginning in the fall of 1989 and ending in the spring of 1990. Do not include summer school or night school.

L4. According to our records, some classes will be conducted in grades 1 through 12 during the current school year. Is that correct?

YES	1	
NO	2	[TERMINATE INTERVIEW]
DK	8	

L5. As we mentioned in our letter to you, I will need to take away a copy of (SCHOOL NAME)'s asbestos management plan. Can you please give me a copy of the management plan now?

WHEN THE RESPONDENT GIVES YOU A MANAGEMENT PLAN: May I take this copy, or may I photocopy it here? Westat will be happy to reimburse you for the cost of photocopying these materials. If you will give me an invoice I will have the payment processed. You should receive a check from Westat within the next 2 weeks.

I need to verify that I have the following information as part of (SCHOOL NAME)'s asbestos management plan. Do the materials that you have given me include:

	YES	LOCATION	NO, BUT WILL PROVIDE LATER	NO, DID NOT PROVIDE
a. The building inspector's report from the school's AHERA inspection for asbestos?	1 [VERIFY]	______	2	3
b. Response action recommendations made as a result of the school's AHERA inspection?	1 [VERIFY]	______	2	3
c. Operations and maintenance (O&M) plan for the school in response to AHERA?	1 [VERIFY]	______	2	3
d. Copies of documentation from all notifications to parents about asbestos in response to AHERA?	1 [VERIFY]	______	2	3
e. Copies of AHERA clearance air monitoring results for response actions completed, including identification of areas cleared?	1 [VERIFY]	______	2	3

ATTEMPT TO OBTAIN THE MATERIALS LISTED ABOVE FROM THE RESPONDENT BEFORE CONTINUING WITH THE INTERVIEW.

IF YOU NEED TO PHOTOCOPY THE MATERIALS, PROCEED WITH THE INTERVIEW AND DO THE PHOTOCOPYING AT THE END.

BOX 5

I now have a few questions about custodial and maintenance staff in [SCHOOL NAME].

L6. Since October 1987, has asbestos-related training been held for:

	YES	NO	DK
a. Custodians in this school?	1	2	8
b. Maintenance workers in this school?	1	2	8

BOX 6

IF BOTH SHADED NUMBERS ARE CIRCLED IN L6, CONTINUE.
IF ONLY ONE SHADED NUMBER IS CIRCLED IN L6, SKIP TO L20, PAGE 6.
IF NO SHADED NUMBER IS CIRCLED IN L6, SKIP TO L26, PAGE 8.

L7. Was the most recent asbestos training session conducted for both custodians and maintenance workers, or were they trained at separate sessions?

SAME SESSION	1	[SKIP TO L20, PG 6]
SEPARATE SESSIONS	2	
DK	8	

L8. Was the most recent asbestos-related training for custodians conducted at the school or off site?

AT THE SCHOOL	1
OFF SITE	2
BOTH	3
DK	8

L9. How many hours long was the most recent asbestos-related training for custodians?

|__|__|
(HOURS)

DK	98

L10. Did this training for custodians include a description of where asbestos-containing materials were found in the school?

YES	1	
NO	2	[SKIP TO L12]
DK	8	[SKIP TO L12]

L11. Did the description of these locations involve:

	YES	NO	DK
a. A building walkthrough?	1	2	8
b. A presentation of floorplans of the building, with the areas containing asbestos marked?	1	2	8
c. A verbal description?	1	2	8
d. Some other description?	1	2	8

(SPECIFY) ____________________

L12. Are these training sessions held:

Once a month	1
Once every 6 months	2
Once a year	3
On another schedule	8

(SPECIFY) ____________________

____

L13. What are the provisions for training new custodians hired after the start of the school year?

RECORD VERBATIM: ____________________

____

____

____

L14. Was the most recent asbestos-related training for maintenance workers conducted at the school or off site?

AT THE SCHOOL	1
OFF SITE	2
BOTH	3
DK	8

L15. How many hours long was the most recent asbestos-related training for maintenance workers?

|__|__|
(HOURS)

DK	98

L16. Did this training for maintenance workers include a description of where asbestos-containing materials were found in the school?

YES	1	
NO	2	[SKIP TO L18]
DK	8	[SKIP TO L18]

L17. Did the description of these locations involve:

	YES	NO	DK
a. A building walkthrough?	1	2	8
b. A presentation of floorplans of the building, with the areas containing asbestos marked?	1	2	8
c. A verbal description?	1	2	8
d. some other description	1	2	8

(SPECIFY) ______________________

L18. Are these training sessions held:

Once a month	1
Once every 6 months	2
Once a year	3
On another schedule	8

(SPECIFY)______________________

____

L19. What are the provisions for training new maintenance workers hired after the start of the school year?

RECORD VERBATIM: ______________________

____

____

____

[SKIP TO L26]

L20. Was the most recent asbestos-related training for custodial and maintenance staff conducted at the school or off site?

AT THE SCHOOL	1
OFF SITE	2
BOTH	3
DK	8

L21. How many hours long was the most recent asbestos-related training for custodial and maintenance staff?

|___|___|
(HOURS)

DK	98

L22. Did this training include a description of where asbestos-containing materials were found in the school?

YES	1	
NO	2	[SKIP TO L24]
DK	8	

L23. Did the description of these locations involve:

	YES	NO	DK
a. A building walkthrough?	1	2	8
b. A presentation of floorplans of the building, with the areas containing asbestos marked?	1	2	8
c. A verbal description?	1	2	8
d. Some other description?	1	2	8

(SPECIFY) ____________________

L24. Are these training sessions held:

Once a month	1
Once every 6 months	2
Once a year	3
On another schedule	8

(SPECIFY)____________________

____

L25. What are the provisions for training new workers hired after the start of the school year?

RECORD VERBATIM: ____________________

____

____

____

L26. Are maintenance services within this school performed by:

	YES	NO	DK
a. School maintenance staff?	1	2	8
b. Private contractors?	1	2	8
c. Employees of the LEA not based in the school?	1	2	8
d. Some other arrangement?	1	2	8

(SPECIFY)

____

BOX 7

To make sure that we have correctly recorded the information you gave our telephone interviewer, I would like to verify some information about the buildings that make up [SCHOOL NAME].

SKIP TO BUILDING FACTS SHEET ON YOUR CASE FOLDER. VERIFY ALL FACTS ABOUT ALL BUILDINGS LISTED ON THE SHEET. IF THERE IS A CORRECTION, MAKE IT ON THE PHOTOCOPY OF THE SCREENER. DO NOT WRITE ON THE BUILDING FACTS SHEET.

L27. Are there additional permanent or temporary buildings that are part of (SCHOOL NAME), that are not included on this list?

YES	1	[FILL IN ON PHOTOCOPY OF SCREENER]
NO	2	
DK	8	

BOX 8

REVIEW THE PHOTOCOPY OF THE SCREENER FOR THIS BUILDING AND DETERMINE IF THERE HAS BEEN A CHANGE IN ELIGIBILITY FOR ANY OF THE BUILDINGS AT THIS SCHOOL. THIS INCLUDES BOTH SELECTED AND NON-SELECTED BUILDINGS. IF THERE HAS BEEN A CHANGE IN ELIGIBILITY, SELECT THE BUILDING(S) TO BE INCLUDED IN THE STUDY. IF YOU MUST RESELECT, EXPLAIN TO THE ADP THAT YOU ARE "VERIFYING WHICH BUILDING SHOULD BE VISITED." TELL THE ADP THAT YOU ARE "SELECTING" ONLY IF THE BUILDING ORIGINALLY SELECTED CHANGES. IT IS POSSIBLE YOU WILL SELECT THE SAME BUILDING THAT WAS ORIGINALLY SELECTED.

BOX 9

GO TO FORM A2.

End time: ____________ am pm

OMB No. 2070-0034
Expires 6/30/90

[AFFIX LABEL HERE]

U.S. ENVIRONMENTAL PROTECTION AGENCY

AHERA EVALUATION STUDIES

FORM A2: Building Information

March 1990

Public reporting burden for this collection of information is estimated to average 30 minutes, including time for hearing instructions, reporting information, and reviewing information.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to:

Chief, Information Policy Branch
U.S. Environmental Protection Agency
401 M Street, S.W. (PM-223)
Washington, DC 20460

and

Office of Management and Budget
Paperwork Reduction Project (2070-0034)
Washington, DC 20503

Westat, Inc.
1650 Research Boulevard
Rockville, MD 20850

Start time: ____________ am / pm

AHERA
Form A2: Building Information

A1. HOW MANY BUILDINGS ARE LISTED ON THE INFORMATION LABEL?

ONE (1)	1	[SKIP TO BOX 2]
TWO (2)	2	

BOX 1

Two buildings from (SCHOOL NAME) were selected for inclusion in this study. I am going to ask you a series of questions about each of those buildings.

The following questions are about (BUILDING1 NAME/BUILDING2 NAME).

SKIP TO BOX 3.

BOX 2

We've selected [BUILDING NAME] from this school for this study. The following questions are about that building.

BEFORE YOU CONTINUE, BE SURE THAT YOU AND THE RESPONDENT HAVE THE SAME UNDERSTANDING OF WHAT YOU MEAN WHEN YOU REFER TO THE BUILDING.

BOX 3

As we mentioned in our letter to you, I need to obtain two copies of the floorplans for all floors of that building from you. We will use these floorplans to prepare for the building inspection. Do you have those available for me now?

WHEN THE RESPONDENT GIVES YOU FLOORPLANS: May I take these copies, or may I photocopy them here?

YOU NEED TO HAVE TWO COPIES OF THE FLOORPLAN. MARK EACH PAGE OF ONE COPY AS 'MASTER' ON THE TOP CENTER OF THE PAGE AND AFFIX SCHOOL ID LABEL TO THE TOP RIGHT HAND CORNER. USE THIS "MASTER" COPY FOR ALL MARKINGS.

BOX 4

VERIFY THAT THE FLOORPLANS HAVE THE FOLLOWING INFORMATION. IF ANY INFORMATION IS MISSING, ASK THE RESPONDENT TO SUPPLY IT. CHECK OFF EACH ITEM AS YOU OBTAIN IT.

1. ☐ LAYOUT OF ALL FLOORS. [PROBE FOR ATTIC, BASEMENT]

IF THE RESPONDENT CANNOT SUPPLY FLOORPLANS FOR ALL FLOORS OR AREAS, LIST IN BOX 5 THE FLOORS OR AREAS FOR WHICH YOU DO NOT HAVE FLOORPLANS.

OBTAIN OR DRAW FLOORPLAN FOR ALL FLOORS OR AREAS LISTED IN BOX 5.

2. ☐ NORTH/SOUTH DIRECTION ARROW.

WRITE NORTH/SOUTH DIRECTION ARROW ON ANY FLOORPLAN ON WHICH IT IS MISSING. WRITE IN THE LOWER RIGHT HAND CORNER IN PENCIL.

3. ☐ APPROXIMATE EXTERIOR DIMENSIONS OF EACH FLOOR. GET BOTH LENGTH AND WIDTH, IF AVAILABLE.

IF EXTERIOR DIMENSIONS ARE NOT ALREADY PRINTED ON THE FLOORPLAN(S), ADD THEM TO THE FLOORPLAN(S) IN PENCIL FOR EACH FLOOR, UNLESS FLOORS ARE IDENTICAL.

CONTINUE WITH BOX 6.

BOX 5

LIST ALL FLOORS OR AREAS FOR WHICH THE RESPONDENT COULD NOT SUPPLY FLOORPLANS:

____

____

____

____

____

____

CONTINUE WITH THE SECOND ITEM IN THE CHECKLIST IN BOX 4.

BOX 6

Now I have a few questions about the age of (BUILDING NAME).

A2. Were all sections of this building constructed at the same time?

YES	1	[SKIP TO A4]
NO	2	
DK	8	

A3. SHOW THE RESPONDENT THE FLOORPLAN OF THE FIRST FLOOR OF THE BUILDING.

Please indicate each section of the building constructed at a separate time on this floorplan. Begin with the original section, and include all new floors or mechanical areas. Now please tell me the name of the section, and the year in which construction was completed.

SECTION NAME	YEAR COMPLETED	DK
______________________ (ORIGINAL SECTION)	|__|__|__|__|	9998
______________________	|__|__|__|__|	9998
______________________	|__|__|__|__|	9998
______________________	|__|__|__|__|	9998
______________________	|__|__|__|__|	9998

BOX 7

SKIP TO BOX 8.

A4. SHOW THE RESPONDENT THE FLOORPLAN OF THE FIRST FLOOR OF THE BUILDING.

Now I am interested in the different wings of the building. Please indicate on the floorplan each wing of the building, beginning with main part of the building. Now please tell me the name of the wing and the year in which construction was completed.

WING NAME	YEAR COMPLETED	DK
____________________	|__|__|__|__|	9998
(MAIN PART)		
____________________	|__|__|__|__|	9998
____________________	|__|__|__|__|	9998
____________________	|__|__|__|__|	9998
____________________	|__|__|__|__|	9998

BOX 8

MARK IN RED INK, ON THE MASTER FLOORPLAN OF THE BUILDING, EACH SECTION/WING AND THE DATE IT WAS COMPLETED. MAKE SURE THAT THE SECTIONS/WINGS ARE NOT SEPARATE BUILDINGS BY OUR DEFINITION.

PRINT EACH SECTION/WING NAME IN PENCIL ON THE FLOORPLAN OFF TO THE SIDE. DRAW AN ARROW FROM THE NAME OF THE SECTION/WING TO THE SECTION/WING. CIRCLE EACH NAME TO CLEARLY IDENTIFY IT.

IF THE SCHOOL DOES NOT HAVE A NAME FOR THE SECTION/WING, NAME IT BY COMPASS DIRECTION (E.G., "EAST WING", "NORTH SECTION", ETC.).

BOX 9

I need to locate specific areas on the floorplan. For each type of room that I read, please indicate whether this building has that type of room, and locate it on the floorplan for me?

A5. Does this building have ... ?

	YES		NO	DK
a. crawlspaces?	1	[MARK ON FLOORPLAN]	2	8
b. boilerrooms?	1	[MARK ON FLOORPLAN]	2	8
c. rooftop HVAC units?	1	[MARK ON FLOORPLAN]	2	8
d. other mechanical or electric rooms?	1	[MARK ON FLOORPLAN]	2	8

(SPECIFY) ______________________________

A6. Is this building served by other HVAC units outside of the building?

YES	1	
NO	2	[SKIP TO BOX 10]
DK	8	[SKIP TO BOX 10]

A7. Do these outside HVAC units serve:

Just this building?	1	
Other buildings in addition?	2	[SKIP TO BOX 10]
DK	8	[SKIP TO BOX 10]

A8. Where are these outside HVAC units located?

RECORD VERBATIM: ____

____

____

____

____

____

BOX 10

Now I have some more specific questions about the heating, ventilation, and air conditioning systems in this building.

A9. Is the heating system the same in all sections of the building?

YES	1	
NO	2	[SKIP TO A11]
DK	8	[SKIP TO A11]

A10. What type of heating system does the building have?

RECORD VERBATIM: ____

____

____

____

____

____ [SKIP TO A12]

A11. Please list each type of heating system and the section or wing of the building it serves [RECORD VERBATIM]

LOCATION	HEATING SYSTEM
____________	______________________________
	______________________________
	______________________________
	______________________________
____________	______________________________
	______________________________
	______________________________
	______________________________
____________	______________________________
	______________________________
	______________________________
	______________________________
____________	______________________________
	______________________________
	______________________________
	______________________________

A12. Does this building have air conditioning?

YES	1	
NO	2	[SKIP TO BOX 11]
DK	8	

A13. Is the air conditioning system the same in the entire building?

YES	1	
NO	2	[SKIP TO A15]
DK	8	

A14. What type of air conditioning system does the building have?

(RECORD VERBATIM.) ______________________________

____

____

______________________________ [SKIP TO BOX 11]

A15. Would you please list each type of air conditioning system and the section or wing of the building it serves. [RECORD VERBATIM]

LOCATION	AIR CONDITIONING SYSTEM
______	______________________________
	______________________________
	______________________________
	______________________________
______	______________________________
	______________________________
	______________________________
	______________________________
______	______________________________
	______________________________
	______________________________
	______________________________
______	______________________________
	______________________________
	______________________________
	______________________________

BOX 11
The next questions are about air plenums. By air plenums, I mean a space above a dropped ceiling through which heated or air conditioned air passes.

A16. Does this building have air plenums?

YES	1	
NO	2	} [SKIP TO BOX 12]
DK	8	} [SKIP TO BOX 12]

A17. Do all parts of this building have air plenums?

YES	1	[SKIP TO BOX 12]
NO	2	
DK	8	[SKIP TO BOX 12]

A18. Please list all sections or wings and floors of the building that have air plenums.

______________________ SECTION/WING NAME ______________ FLOOR

______________________ SECTION/WING NAME ______________ FLOOR

______________________ SECTION/WING NAME ______________ FLOOR

______________________ SECTION/WING NAME ______________ FLOOR

______________________ SECTION/WING NAME ______________ FLOOR

BOX 12

The next questions are about major renovations that have been done in any part of this building since its original construction.

A19. For each of the following types of renovation, please indicate whether this building has undergone any renovations of that type, and show me on this floorplan where they were done.

Since the original construction of any parts of the building has anyone:

		YES		NO	DK
a.	Torn down walls? .... [PROBE FOR ADDITIONAL]	1	[OUTLINE ON FLOORPLAN WITH YELLOW MARKER AND DESCRIBE]	2	8
b.	Changed the height of any ceilings? .... [PROBE FOR ADDITIONAL]	1	[OUTLINE ON FLOORPLAN WITH YELLOW MARKER AND DESCRIBE]	2	8
c.	Changed the routing of any pipes? .... [PROBE FOR ADDITIONAL]	1	[OUTLINE ON FLOORPLAN WITH YELLOW MARKER AND DESCRIBE]	2	8
d.	Hidden any walls behind new construction? .... [PROBE FOR ADDITIONAL]	1	[OUTLINE ON FLOORPLAN WITH YELLOW MARKER AND DESCRIBE]	2	8
e.	Sealed off any doors? .... [PROBE FOR ADDITIONAL]	1	[OUTLINE ON FLOORPLAN WITH YELLOW MARKER AND DESCRIBE]	2	8
f.	Done any other type of renovations that required more than 1 week of work?	1	[OUTLINE ON FLOORPLAN WITH YELLOW MARKER AND DESCRIBE]	2	8

(SPECIFY) ____

____

____

[PROBE FOR ADDITIONAL]

BOX 13

Now I would like to ask you a few questions about asbestos remediation that has been done in (BUILDING NAME) in response to AHERA.

A20. Since December 1987, have any of the following types of asbestos remediation been performed on 3 or more linear feet, or 3 or more square feet, of asbestos-containing building material, or suspect material, in (BUILDING NAME)?

	YES	NO	DK
a. Removal	1	2	8
b. Encapsulation	1	2	8
c. Enclosure	1	2	8
d. Repair	1	2	8

BOX 14

IF ANY SHADED NUMBERS ARE CIRCLED IN A20, CONTINUE. OTHERWISE, SKIP TO BOX 16.

BOX 15

I would like to ask you a few questions about each type of remediation that has been performed in this building.

SKIP TO FORM W1.

BOX 16

Those are all of the questions that I have.

We have scheduled an appointment on (APPOINTMENT DATE) at (APPOINTMENT TIME) for one of our inspectors to inspect (SCHOOL NAME) for asbestos. Will you be able to participate in all or part of the inspection?

CHECK THE "YES" BOX ON THE CALL RECORD NEXT TO "AHERA DESIGNATED PERSON WILL PARTICIPATE IN BUILDING INSPECTION" IF THE RESPONDENT WISHES TO PARTICIPATE IN THE INSPECTION. OTHERWISE, CHECK THE "NO" BOX.

IF THE AHERA DESIGNATED PERSON WILL ATTEND, SKIP TO BOX 17.

A21. Please give me the name and position of the person who will accompany us on the inspection?

NAME ______________________ POSITION ______________________

NAME ______________________ POSITION ______________________

BOX 17

We will send you the results of the inspection as soon as possible after we visit the building.

Thank you very much for your cooperation with this study.

COMMENTS

End time: ________ am pm

OMB No. 2070-0034
Expires 6/30/90

[AFFIX LABEL HERE]

U.S. ENVIRONMENTAL PROTECTION AGENCY

AHERA EVALUATION STUDIES

FORM P1: Principal Interview

March 1990

Public reporting burden for this collection of information is estimated to average 15 minutes, including time for hearing instructions, reporting information, and reviewing information.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to:

Chief, Information Policy Branch
U.S. Environmental Protection Agency
401 M Street, S.W. (PM-223)
Washington, DC 20460

and

Office of Management and Budget
Paperwork Reduction Project (2070-0034)
Washington, DC 20503

Westat, Inc.
1650 Research Boulevard
Rockville, MD 20850

Start time: ____________ am / pm

AHERA
Form P1: Principal Interview

BOX 1

Hello, (PRINCIPAL NAME), my name is (YOUR NAME). I work with Westat, a survey research firm in Rockville, Maryland. I am here regarding an AHERA survey that we are conducting for the Environmental Protection Agency. As we explained in our letter to you, the EPA has asked Westat to conduct a study to evaluate AHERA in randomly selected schools in the United States.

For this study, (BUILDING NAME(S)) will be re-inspected, including a room-by-room walkthrough. Any suspect material found will be categorized, but no physical samples will be taken. No classes will be interrupted.

Your help is essential because we cannot use anyone else in your place. The information you provide will not be identified with you or your school.

P1. Before we get started, I would like to be sure that we have recorded your name correctly. Is the correct spelling [SAY TITLE AND SPELL PRINCIPAL's NAME]?

YES	1
NO	2

(CORRECT SPELLING) ____

BOX 2

The following questions are about the number of students attending (NAME OF SCHOOL) during this school year, and which grades are being taught during this school year. When answering these questions, please give me information for the school year beginning in the fall of 1989 and ending in the spring of 1990. Do not include summer school or night school.

P2. Approximately how many students are attending (NAME OF SCHOOL) during this school year?

|__|,|__|__|__|
(NUMBER OF STUDENTS)

DK	9998

P3. For what grades are you conducting classes this school year? [PROBE: Any others?]

a.	PRESCHOOL	1
b.	KINDERGARTEN	1
c.	FIRST GRADE	1
d.	SECOND GRADE	1
e.	THIRD GRADE	1
f.	FOURTH GRADE	1
g.	FIFTH GRADE	1
h.	SIXTH GRADE	1
i.	SEVENTH GRADE	1
j.	EIGHTH GRADE	1
k.	NINTH GRADE	1
l.	TENTH GRADE	1
m.	ELEVENTH GRADE	1
n.	TWELFTH GRADE	1
o.	SPECIAL EDUCATION	1
p.	VOCATIONAL CLASSES	1
q.	JUNIOR COLLEGE	1
r.	COLLEGE	1
s.	OTHER (SPECIFY): ________________________________	1
t.	DK	8

BOX 3

IF ANY SHADED NUMBERS ARE CIRCLED IN P3, CONTINUE. OTHERWISE, TERMINATE INTERVIEW.

BOX 4

The next few questions are about notifications to parents of students in this school regarding activities relating to asbestos that have been performed in this school since December 1987. Please feel free to refer to your copies of notifications.

P4. **Since December 1987, has the school or school board administration ever notified parents of students about any activities pertaining to asbestos in this school, such as a letter to parents, a meeting, or an article in the school newspaper?**

YES	1	
NO	2	**[SKIP TO BOX**
DK	8	**PG. 8]**

P5. Since December 1987, have parents been notified more than once about activities pertaining to asbestos in this school?

YES	1	[SKIP TO P14]
NO	2	
DK	8	

P6. In what month and year, since December 1987, were parents notified of activities pertaining to asbestos?

|__|__|, 198|__|
(MONTH) (YEAR)

DK	9898

P7. Were parents notified by the school:

In a letter, notice, or publication regularly sent to parents (such as a school newsletter)?	1
By a special letter, notice or publication sent to parents specifically to inform them of school activities regarding asbestos?	2
During a regular parent-teacher meeting, such as PTA meeting?	3
During a meeting called specifically to discuss asbestos in this school?	4
In an official press release?	5
In some other ways? (SPECIFY): __________	6
DK	8

BOX 5

IF ANY SHADED NUMBERS ARE CIRCLED IN P7, CONTINUE. OTHERWISE, SKIP TO P9.

P8. Regarding the school meeting or meetings held, were minutes or written records later published or distributed?

YES	1
NO	2
DK	8

P9. Did the notification contain:

		YES	NO	DK
a.	Information about the availability of a management plan?	1	2	8
b.	An announcement about the performance of the initial AHERA building inspection?	1	2	8
c.	A list of materials containing asbestos found in the school as well as the location of these materials, at the time of the initial inspection?	1	2	8
d.	An announcement of response actions, such as removal, encapsulation, enclosure of building materials containing asbestos or suspected to contain asbestos?	1	2	8
e.	An announcement of other actions regarding asbestos in the school? (SPECIFY): ______________ ______________	1	2	8
f.	General information about asbestos?	1	2	8

P10. Did you receive any reaction to the notification from parents such as:

		YES	NO	DK
a.	Requests to see the management plan?	1	2	8
b.	Requests for additional information?	1	2	8
c.	Requests for a special meeting to discuss asbestos in this school?	1	2	8
d.	Requests to add the topic of asbestos in this school to the agenda of a regular PTA or similar organization meeting?	1	2	8
e.	Withdrawal of children from classes in this school?	1	2	8

P11. Were there any other reactions from parents?

YES 1
(SPECIFY)

____

____

____

NO 2
DK 8

BOX 6

IF NO SHADED NUMBERS ARE CIRCLED IN P10 OR P11, SKIP TO BOX 9, PAGE 8. OTHERWISE, CONTINUE.

P12. Would you say a few, some, many or all parents respondec in some way to the notification pertaining to asbestos?

A FEW PARENTS	1	
SOME PARENTS	2	
MANY PARENTS	3	
ALL PARENTS	4	
DK	2	[SKIP TO BOX 9, PG. 8]

P13. For parents who responded to the notification, would you say they expressed little concern, some concern, or considerable concern?

LITTLE CONCERN	1	[SKIP TO BOX 9] PG. 8]
SOME CONCERN	2	
CONSIDERABLE CONCERN	3	
DK	8	

P14. How many times were parents notified about activities in this school pertaining to asbestos since December 1987?

|__|__| (NUMBER OF TIMES)

DK 98

P15. Beginning with the first notification, please give me the month and year in which parents were notified about activities in this school pertaining to asbestos since December, 1987. **[VERIFY THAT ALL DATES LISTED ARE SINCE DECEMBER 1987]**

		DK
a.	|__|__| (MONTH), 198|__| (YEAR)	9898
b.	|__|__| (MONTH), 198|__| (YEAR)	9898
c.	|__|__| (MONTH), 198|__| (YEAR)	9898
d.	|__|__| (MONTH), 198|__| (YEAR)	9898
e.	|__|__| (MONTH), 198|__| (YEAR)	9898

P16. Were parents ever notified by the school:

	YES	NO	DK
a. In a letter, notice, or publication regularly sent to parents (such as a school newsletter)?	1	2	8
b. By a special letter, notice, or publication sent to parents specifically to inform them of school activities regarding asbestos?	1	2	8
c. During a regular parent-teacher meeting, such as PTA meeting?	1	2	8
d. During a meeting called specifically to discuss asbestos in this school?	1	2	8
e. In an official press release?	1	2	8
f. In some other ways? (SPECIFY): ______ ______	1	2	8

BOX 7

IF ANY SHADED NUMBERS ARE CIRCLED IN P16, CONTINUE. OTHERWISE, SKIP TO P18

P17. Regarding the school meeting or meetings held, were minutes or written records later published or distributed by the school?

YES	1
NO	2
DK	8

P18. Did any of the notifications contain:

	YES	NO	DK
a. Information about the availability of a management plan?	1	2	8
b. An announcement about the performance of the initial AHERA building inspection?	1	2	8
c. A list of materials containing asbestos found in the school as well as the location of these materials, at the time of the initial inspection?	1	2	8
d. An announcement of response actions, such as removal, encapsulation, or enclosure of building materials containing asbestos, or suspected to contain asbestos?	1	2	8
e. An announcement of other actions regarding asbestos in the school? (SPECIFY): ______ ______	1	2	8
f. General information about asbestos?	1	2	

P19. Did you receive any reactions to the notifications from parents such as:

		YES	NO	DK
a.	Requests to see the management plan?	1	2	8
b.	Requests for additional information?	1	2	8
c.	Requests for a special meeting to discuss asbestos in this school?	1	2	8
d.	Requests to add the topic of asbestos in this school to the agenda of a regular PTA or similar organization meeting?	1	2	8
e.	Withdrawal of children from classes in this school?	1	2	8

P20. Were there any other reactions from parents?

YES (SPECIFY)	1
NO	2
DK	8

BOX 8

IF NO SHADED NUMBERS ARE CIRCLED IN P19 OR P20, SKIP TO BOX 9, PAGE 8. OTHERWISE, CONTINUE.

P21. Would you say a few, some, many or all parents responded in some way to the notifications pertaining to asbestos?

A FEW PARENTS	1	
SOME PARENTS	2	
MANY PARENTS	3	
ALL PARENTS	4	
DK	8	[SKIP TO BOX 9]

P22. From parents who responded to the notifications, would you say they expressed little concern, some concern, or considerable concern?

LITTLE CONCERN	1
SOME CONCERN	2
CONSIDERABLE CONCERN	3
DK	8

BOX 9

We will need to contact other people such as representatives of teachers' unions and parents' groups to interview them for another part of this research effort. The following questions refer to these people.

P23. Do the teachers employed in this school belong to a union?

YES	1	
NO	2	[SKIP TO P26]
DK	8	

P24. Please give me the name and title of the teachers' union representative (or association representative) for the 1989-1990 school year. **[IF MORE THAN ONE TEACHER UNION REPRESENTATIVE, RECORD ADDITIONAL NAMES]**

	NAME	TITLE
a.		
b.		
c.		
d.		
e.		

REFUSED	7
DK	8

BOX 10

IF P24 IS "REFUSED" OR "DON'T KNOW," OFFER POSTCARD TO PRINCIPAL. IS POSTCARD GIVEN?

YES... 1 [SKIP TO P28]

NO ....2 [SKIP TO P26]

P25. Please give me [EACH TEACHER'S NAME]'s evening telephone number, beginning with the area code.

				POSTCARD FILLED OUT
a.	( ) - (EVENING PHONE #)	REFUSED .... DK	7 8	YES ..... 1 NO 2
b.	( ) - (EVENING PHONE #)	REFUSED .... DK	7 8	YES ..... 1 NO 2
c.	( ) - (EVENING PHONE #)	REFUSED .... DK	7 8	YES ..... 1 NO 2
d.	( ) - (EVENING PHONE #)	REFUSED .... DK	7 8	YES ..... 1 NO 2
e.	( ) - (EVENING PHONE #)	REFUSED .... DK	7 8	YES ..... 1 NO 2

BOX 11

SKIP TO P28

P26. Please give me the name and title of a teacher who holds a leadership role at the school, similar to a teachers' union building representative (or association representative), for the 1989-1990 school year.

	NAME	TITLE
a.	____________	____________
b.	____________	____________
c.	____________	____________
d.	____________	____________
e.	____________	____________

THERE ISN'T ONE	6	[SKIP TO P28]
REFUSED	7	
DK	8	

BOX 12

IF P26 IS "REFUSED" OR "DON'T KNOW," OFFER POSTCARD TO PRINCIPAL. IS POSTCARD GIVEN?

YES... 1 [SKIP TO P28]

NO ....2 [SKIP TO P28]

257

P27. Please give me [EACH TEACHER'S NAME]'s evening telephone number, beginning with the area code.

				POSTCARD FILLED OUT
a.	( ) - (EVENING PHONE #)	REFUSED DK	7 8	YES ......1 NO 2
b.	( ) - (EVENING PHONE #)	REFUSED DK	7 8	YES.....1 NO.......2
c.	( ) - (EVENING PHONE #)	REFUSED DK	7 8	YES.....1 NO 2
d.	( ) - (EVENING PHONE #)	REFUSED DK	7 8	YES.....1 NO 2
e.	( ) - (EVENING PHONE #)	REFUSED DK	7 8	YES.....1 NO 2

P28. Is there a PTA or another type of parent group at this school?

YES	1	
NO	2	[SKIP TO P31]
DK	8	[SKIP TO P31]

P29. Please give me the name and title of the PTA or other similar parent group president or head for this school year. Please give me the name of one other officer for this school year?

	NAME	TITLE
a.		
b.		

REFUSED	7
DK	8

BOX 13

IF P29 IS "REFUSED" OR "DON'T KNOW," OFFER POSTCARD TO PRINCIPAL. IS POSTCARD GIVEN

YES... 1 [SKIP TO P31] **NO ....2 [SKIP TO P31]**

25

P30. Please give [EACH PARENT'S NAME]'s evening telephone number, beginning with the area code.

				POSTCARD FILLED OUT
a.	( ) - (EVENING PHONE #)	REFUSED DK	7 8	YES ......1 NO 2
b.	( ) - (EVENING PHONE #)	REFUSED DK	7 8	YES ......1 NO 2

BOX 14

GO TO CLOSING STATEMENT

P31. Please give me the name and evening phone number of a parent who is actively involved in the activities of this school and who is not a paid employee of the school.

			POSTCARD FILLED OUT
(NAME)	REFUSED DK	7 8	YES.....1 NO 2
( ) - (EVENING PHONE #)	REFUSED DK	7 8	YES.....1 NO 2

CLOSING STATEMENT

Thank you very much for your support and cooperation with this questionnaire as well as for permitting us to do the building walkthrough. The findings of the walkthrough inspection will be sent to the AHERA designated person for this school.

End time: ____________ am / pm

AHERA

FORM W1: Remediation Assessment

[Affix label here]

Room Name or Number ______________________ [HIGHLIGHT FLOORPLAN IN BLUE]	Area ID |___|___|

Respondent	Description of material and remediation	Confirmation of remediation	Reason for non-confirmation	Type	Remediation [>3 LINEAR OR SQUARE FEET]	Observations				
						Laminated	Complete barrier	Impact resistant	Airtight	Material removed
ADP 1 Insp. 2 Other 3 (SPECIFY) __________		Yes 1 No 2		TSI 1 Surf. 2 Misc. 3	Enclosure 1	▨	▨	Yes 1 No 2	Yes 1 No 2	▨
					Encapsulation 2	Yes 1 No 2	Yes 1 No 2	▨	▨	▨
					Removal 3	▨	▨	▨	▨	Yes 1 No 2
					Repair 4	Yes 1 No 2	▨	▨	Yes 1 No 2	▨
ADP 1 Insp. 2 Other 3 (SPECIFY) __________		Yes 1 No 2		TSI 1 Surf. 2 Misc. 3	Enclosure 1	▨	▨	Yes 1 No 2	Yes 1 No 2	▨
					Encapsulation 2	Yes 1 No 2	Yes 1 No 2	▨	▨	▨
					Removal 3	▨	▨	▨	▨	Yes 1 No 2
					Repair 4	Yes 1 No 2	▨	▨	Yes 1 No 2	▨
ADP 1 Insp. 2 Other 3 (SPECIFY) __________		Yes 1 No 2		TSI 1 Surf. 2 Misc. 3	Enclosure 1	▨	▨	Yes 1 No 2	Yes 1 No 2	▨
					Encapsulation 2	Yes 1 No 2	Yes 1 No 2	▨	▨	▨
					Removal 3	▨	▨	▨	▨	Yes 1 No 2
					Repair 4	Yes 1 No 2	▨	▨	Yes 1 No 2	▨
ADP 1 Insp. 2 Other 3 (SPECIFY) __________	26	Yes 1 No 2		TSI 1 Surf. 2 Misc. 3	Enclosure 1	▨	▨	Yes 1 No 2	Yes 1 No 2	▨
					Encapsulation 2	Yes 1 No 2	Yes 1 No 2	▨	▨	▨
					Removal 3	▨	▨	▨	▨	Yes 1 No 2
					Repair 4	Yes 1 No 2	▨	▨	Yes 1 No 2	▨

[NEXT FORM W1 OR RETURN TO FORM A2]

FILL IN: PAGE ☐ OF ☐ FOR THIS AREA

AHERA
FORM W2: Area Identification

[Affix label here]

Area				Area use code	Number of suspect homogeneous materials [IF > 0, FORM W3]		Remediation [REVIEW FLOORPLAN IF YES, FORM W1]
Area ID [MARK FLOORPLAN]	Room number or name [LIST ALL AREAS INCLUDED]	Section name	Level				
|__| 0			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 1			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 2			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 3			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 4			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 5			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 6			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 7			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 8			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2
|__| 9			Basement 1	|__|__| (SPECIFY) ______	TSI	|__|__|__|	Yes 1
			Floor (SPECIFY) 2		Surf.	|__|__|__|	
			Other (SPECIFY) 3		Misc.	|__|__|__|	No 2

26[illegible]

FILL IN: PAGE ☐ OF ☐ FOR THIS BUILDING

26[illegible]

AREA USE CODE FOR FORM W2

EXTERIOR AREAS

Portico	01
Covered connecting walkway	02
Other exterior area (SPECIFY)	**19**

INTERIOR AREAS

Auditorium (fixed chairs)	21
Classroom (includes closet)	22
Classroom group (classroom & one or more of bathroom & office	23
Dining room (cafeteria)	24
Dormitory bedroom	25
Garage, underground	26
Gymnasium	27
Gymnasium equipment room	28
Hallway, interior	29
Janitor's closet	30
Kitchen	31
Laboratory	32
Library/Media center	33
Lobby/Entryway	34
Locker room	35
Multipurpose room (2 or more of cafeteria, gym, assembly)	36
Office	37
Restroom	38
Stage	39
Stairway	40
Storage/Supply room	41
Swimming pool	42
Teachers' lunch room	43
Teachers' lounge	44
Weight/Exercise room	45
Other interior area (SPECIFY)	**59**

MECHANICAL AREAS

Air and duct shaft	61
Air handling	62
Air plenum	63
Boiler room	64
Crawl space	65
Elevator shaft or equipment	66
Mechanical room	67
Pipe shaft	68
Rooftop HVAC unit	69
Space above dropped ceiling (non-air plenum)	70
Telephone and electrical	71
Other mechanical area (SPECIFY)	**89**

No Access (SPECIFY)	**95**

AHERA
FORM W3: Suspect Homogeneous Materials

[Affix label here]

Room Name or Number ______________________________

Area ID \|___\|___\|

		Suspect homogeneous material dimensions				Current damage		Potential for damage				
Suspect homogeneous material key code	Friable	Shape	Measurement	Unit	Labeled	Local	Dispersed	Pot. water damage	General access	Maint. access	Air Velocity	Effect of Vibration
|___|___|___|	Yes 1 No 2 No access 3	Linear 1 Odd 2 Rectang. 3	|___|___|___|___| |___|___|___|___| by |___|___|___|___|	ft 1 in 2 ft 1 in 2 ft 1 in 2	Yes 1 No 2 Not required 3	<1% 1 1-25% 2 >25% 3	<1% 1 1-10% 2 >10% 3	Yes 1 No 2	Yes 1 No 2	Lo 1 Hi 2	None 1 Lo 2 Hi 3	Lo 1 Hi 2
|___|___|___|	Yes 1 No 2 No access 3	Linear 1 Odd 2 Rectang. 3	|___|___|___|___| |___|___|___|___| by |___|___|___|___|	ft 1 in 2 ft 1 in 2 ft 1 in 2	Yes 1 No 2 Not required 3	<1% 1 1-25% 2 >25% 3	<1% 1 1-10% 2 >10% 3	Yes 1 No 2	Yes 1 No 2	Lo 1 Hi 2	None 1 Lo 2 Hi 3	Lo 1 Hi 2
|___|___|___|	Yes 1 No 2 No access 3	Linear 1 Odd 2 Rectang. 3	|___|___|___|___| |___|___|___|___| by |___|___|___|___|	ft 1 in 2 ft 1 in 2 ft 1 in 2	Yes 1 No 2 Not required 3	<1% 1 1-25% 2 >25% 3	<1% 1 1-10% 2 >10% 3	Yes 1 No 2	Yes 1 No 2	Lo 1 Hi 2	None 1 Lo 2 Hi 3	Lo 1 Hi 2
|___|___|___|	Yes 1 No 2 No access 3	Linear 1 Odd 2 Rectang. 3	|___|___|___|___| |___|___|___|___| by |___|___|___|___|	ft 1 in 2 ft 1 in 2 ft 1 in 2	Yes 1 No 2 Not required 3	<1% 1 1-25% 2 >25% 3	<1% 1 1-10% 2 >10% 3	Yes 1 No 2	Yes 1 No 2	Lo 1 Hi 2	None 1 Lo 2 Hi 3	Lo 1 Hi 2
|___|___|___|	Yes 1 No 2 No access 3	Linear 1 Odd 2 Rectang. 3	|___|___|___|___| |___|___|___|___| by |___|___|___|___|	ft 1 in 2 ft 1 in 2 ft 1 in 2	Yes 1 No 2 Not required 3	<1% 1 1-25% 2 >25% 3	<1% 1 1-10% 2 >10% 3	Yes 1 No 2	Yes 1 No 2	Lo 1 Hi 2	None 1 Lo 2 Hi 3	Lo 1 Hi 2
|___|___|___|	Yes 1 No 2 No access 3	Linear 1 Odd 2 Rectang. 3	|___|___|___|___| |___|___|___|___| by |___|___|___|___|	ft 1 in 2 ft 1 in 2 ft 1 in 2	Yes 1 No 2 Not required 3	<1% 1 1-25% 2 >25% 3	<1% 1 1-10% 2 >10% 3	Yes 1 No 2	Yes 1 No 2	Lo 1 Hi 2	None 1 Lo 2 Hi 3	Lo 1 Hi 2

BEST COPY AVAILABLE

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AHERA
FORM I1T: TSI Key Code

[Affix label here]

<table>
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(size, features, etc.)</th><th colspan="2">Code</th><th rowspan="2">First
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<tr><th colspan="2">Type</th><th colspan="2">Textures</th></tr>
<tr><td>Breeching</td><td>101</td><td>Air cell</td><td>01</td></tr>
<tr><td>Boiler</td><td>102</td><td>Corrugated</td><td>02</td></tr>
<tr><td>Chiller</td><td>103</td><td>Layered paper</td><td>03</td></tr>
<tr><td>Duct - exterior</td><td>104</td><td>Matted or felted</td><td>04</td></tr>
<tr><td>Duct - interior</td><td>105</td><td>Solid</td><td>05</td></tr>
<tr><td>Elbow</td><td>106</td><td>Woven</td><td>06</td></tr>
<tr><td>Fitting</td><td>107</td><td>Other (SPECIFY)</td><td>29</td></tr>
<tr><td>Pipe</td><td>108</td><td colspan="2">Textures Not Included</td></tr>
<tr><td>Tank</td><td>109</td><td colspan="2">Fiberglass
Metal
Plastic
Rubber
Steel
Wood</td></tr>
<tr><td>Tee</td><td>110</td><td colspan="2"></td></tr>
<tr><td>Valve</td><td>111</td><td colspan="2"></td></tr>
<tr><td>Other (SPECIFY)</td><td>159</td><td colspan="2"></td></tr>
</table>

FILL IN: PAGE ☐ OF ☐ FOR THIS BUILDING

AHERA
FORM 11S: Surfacing Material Key Code

[Affix label here]

Surfacing material	Description (size, features, etc.)	Code		First area ID
		Type	Color	
S |___| 0		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 1		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 2		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 3		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 4		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 5		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 6		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 7		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 8		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|
S |___| 9		|___|___|___| (SPECIFY) ________	|___|___| (SPECIFY) ________	|___|___|

Surfacing material codes

Type	
Ceiling material - hard and granular/cementitious	201
Ceiling material - fluffy	202
Ceiling material - soft and granular	203
Ceiling material - textured paint or popcorn	204
Fireproofing - hard and granular/cementitious	205
Fireproofing - fluffy	206
Fireproofing - soft and granular	207
Wall coating - hard and granular/cementitious or stuccoed	208
Wall coating - fluffy	209
Wall coating - soft and granular	210
Wall coating - textured paint or popcorn	211
Other (SPECIFY)	**259**

Color	
Black	31
Blue	32
Brown	33
Gray	34
Green	35
Off-white	36
Orange	37
Pink	38
Purple	39
Red	40
Tan	41
White	42
Yellow	43
Other (SPECIFY)	**59**

Material Types Not Included

- Cinder blocks
- Concrete blocks
- Paint, smooth
- Hard plaster wall
- Sheetrock drywall
- Structural concrete

FILL IN PAGE [ ] OF [ ] FOR THIS BUILDING

AHERA
FORM 11M: Miscellaneous Material Key Code

[Affix label here]

<table>
<tr><th rowspan="2">Miscellaneous material</th><th rowspan="2">Description (size, features, etc.)</th><th colspan="2">Code</th><th rowspan="2">First area ID</th></tr>
<tr><th>Type</th><th>Color</th></tr>
<tr><td>M |__| 0</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 1</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 2</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 3</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 4</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 5</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 6</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 7</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 8</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
<tr><td>M |__| 9</td><td></td><td>|__|__|__|
(SPECIFY)
________</td><td>|__|__|
(SPECIFY)
________</td><td>|__|__|</td></tr>
</table>

Miscellaneous material codes

Type	
Acoustical wall tile	301
Ceiling tile - glue-on	302
Ceiling tile - lay-in	303
Ceiling tile - spline	304
Cooling tower slats	305
Fire doors	306
Floor tile - 9" x 9"	307
Floor tile - 1' x 1'	308
Fume hood sheeting	309
Linoleum or solid floor covering	310
Patch	311
Radiator board	312
Rope insulation	313
Transite™ ducts	314
Transite™ panels	315
Transite™ water pipe (interior)	316
Vibration dampening cloth on ducts	317
Other (SPECIFY)	**359**

Color	
Black	31
Blue	32
Brown	33
Gray	34
Green	35
Off-white	36
Orange	37
Pink	38
Purple	39
Red	40
Tan	41
White	42
Yellow	43
Other (SPECIFY)	**59**

Material Types Not Included

- Adhesives
- Auditorium curtains
- Brake shoes
- Bunsen burner pads
- Carpet
- Caulking
- Electrical wire ins.
- Flooring under wall to wall carpet
- Fire blanket
- Gasket
- Kiln bricks
- Laboratory gloves
- Laboratory table tops
- Light socket collars
- Roofing materials
- Sheetrock
- Stored materials
- Tectum™ board
- Vinyl wall paper

AHERA
FORM I2: Suspect Homogeneous Materials Calculations

[Affix Label Here]

Area ID	Material key code	Calculation space	Total	Units [CIRCLE]
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in
I__I__I	I__I__I__I			ft in

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OMB No. 2070-0034
Expires 8/31/90

[ID NUMBER]

U.S. ENVIRONMENTAL PROTECTION AGENCY

AHERA EVALUATION STUDIES

FORM O1: Inspector's Interview

June 1990

Public reporting burden for this collection of information is estimated to average 15 minutes, including time for hearing instructions, reporting information, and reviewing information.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to:

Chief, Information Policy Branch
U.S. Environmental Protection Agency
401 M Street, S.W. (PM-223)
Washington, DC 20460

and

Office of Management and Budget
Paperwork Reduction Project (2070-0034)
Washington, DC 20503

Westat, Inc.
1650 Research Boulevard
Rockville, MD 20850

AHERA
Form O1: Inspectors' Interview

Start time: ____________ am
pm

Hello, I'm ______(YOUR NAME)______ and I'm calling from Westat, a survey research firm, in Rockville, Maryland. I'm calling about a study we are conducting for the Environmental Protection Agency about asbestos inspectors' backgrounds. Is this [NAME OF INSPECTOR]?

YES	1	
NO	2	[TERMINATE]

1. I also need to verify that the asbestos I.D. number we have listed for you is or was an inspection certification or ID number used by you. Is or was [CERTIFICATION NUMBER] your I.D. number?

YES	1	
NO	2	[TERMINATE]

BOX 1

Westat has selected a nationwide sample of schools that were inspected for asbestos under AHERA. Your name was listed in an AHERA management plan as having participated in at least one school inspection. We would like to ask you a few questions about your background. We'll start with training you may have received in order to become an asbestos inspector.

2. Have you ever received accreditation according to AHERA as an asbestos building inspector?

Yes	1	
No	2	[SKIP TO END]

3. What month and year did you successfully complete the AHERA asbestos building inspector training course?

|__|__| 19|__|__| [IF LESS THAN ONE YEAR AGO, SKIP TO Q7]
MONTH YEAR

DK	9898

4. Have you taken any AHERA inspector refresher courses?

YES	1	
NO	2	[SKIP TO Q7]

5. What month and year did you successfully complete your first AHERA inspector refresher course?

|__|__| 19|__|__|
MONTH YEAR [IF LESS THAN ONE YEAR AGO, SKIP TO Q7]

DK 9898

6. How many AHERA inspector refresher courses have you successfully completed?

|__|__|
[NUMBER OF COURSES]

DK 98

7. Is your accreditation, according to AHERA, as an asbestos inspector current?

YES	1
NO	2
DK	8

8. Have you taken any non-AHERA training related to asbestos?

YES	1	
NO	2	[SKIP TO BOX 2]
DON'T KNOW	8	

9. Was any of this non-AHERA training taken at a

	YES	NO	DK
College or university?	1	2	8
Technical school?	1	2	8
Some other kind of school? (SPECIFY)	1	2	8

____

10. What is the subject area of the most recent non-AHERA training you have taken?

____
(SUBJECT)

277

11. What year did you take this training?

19|__|__|
YEAR

DK 98

BOX 2

The next few questions I will ask are about the asbestos inspections you have conducted. We are interested in inspections you may have conducted alone or as a member of an inspection team. Please include AHERA and non-AHERA inspections, and if you are unsure of the exact answer please give me your best estimate.

12. In what month and year did you conduct your first asbestos inspection?

|__|__| 19|__|__|
MONTH YEAR

DK .... 9898 [SKIP TO Q13]

BOX 3

IF Q12 PRIOR TO 1988, --> GO TO Q13
IF Q12 IS BETWEEN JANUARY-JUNE 1988, --> GO TO Q14
IF Q12 IS BETWEEN JULY-DECEMBER 1988, --> GO TO Q15
IF Q12 IS BETWEEN JANUARY-JUNE 1989, --> GO TO Q16
IF Q12 IS BETWEEN JULY-DECEMBER 1989, --> GO TO 17

27

13. The following series of questions ask for information about the number of buildings or parts of buildings you have inspected for asbestos either alone or as a member of a team.

		How many buildings did you inspect?		How many of those bldgs. were schools?	
		NUMBER	DK	NUMBER	DK
a.	Prior to 1988		98		98
b.	From Jan thru Jun 1988		98		98
c.	From July thru Dec 1988		98		98
d.	From Jan thru Jun 1989		98		98
e.	From July thru Dec 1989		98		98

[SKIP TO BOX 4]

14 The following series of questions ask for information about the number of buildings or parts of buildings you have inspected for asbestos either alone or as a member of a team.

		How many buildings did you inspect?		How many of those bldgs. were schools?	
		NUMBER	DK	NUMBER	DK
a.	Prior to and including June 1988		98		98
b.	From July thru Dec 1988		98		98
c.	From Jan thru Jun 1989		98		98
d.	From July thru Dec 1989		98		98

[SKIP TO BOX 4]

15. The following series of questions ask for information about the number of buildings or parts of buildings you have inspected for asbestos either alone or as a member of a team.

		How many buildings did you inspect?		How many of those bldgs. were schools?	
		NUMBER	DK	NUMBER	DK
a.	Prior to and including Dec 1988		98		98
b.	From Jan thru June 1989		98		98
c.	From July thru Dec 1989		98		98

[SKIP TO BOX 4]

16. The following series of questions ask for information about the number of buildings or parts of buildings you have inspected for asbestos either alone or as a member of a team.

	How many buildings did you inspect?		How many of those bldgs. were schools?	
	NUMBER	DK	NUMBER	DK
a. Prior to and including June 1989...	|__|__|	98	|__|__|	98
b. From July thru Dec 1989................	|__|__|	98	|__|__|	98

[SKIP TO BOX 4]

17. The following question asks for information about the number of buildings or parts of buildings you have inspected for asbestos either alone or as a member of a team.

	How many buildings did you inspect?		How many of those bldgs. were schools?	
	NUMBER	DK	NUMBER	DK
a. Prior to Jan 1990	|__|__|	98	|__|__|	98

BOX 4

The next few questions are about your employment history.

18. Have you ever worked in a building trades industry such as carpentry, plumbing, or construction?

YES 1
NO .... 2 [SKIP TO Q20]

19. How long (have you worked/did you work) in (this industry/these industries)?

|__|__| AND |__|__|
YEARS MONTHS (IF APPLICABLE)

DK 9898

20. Have you ever worked in an environmental services laboratory, such as one where suspect hazardous materials are analyzed?

YES 1
NO .... 2 [SKIP TO Q22]

21. How long (have you worked/did you work) in this field?

|__|__| AND |__|__|
YEARS MONTHS (IF APPLICABLE)

DK 9898

22. Have you ever worked in the fields of environmental health, occupational health and safety, industrial hygiene, or air monitoring, excluding labs?

YES 1
NO .... 2 [SKIP TO Q24]

23. How long (have you worked/did you work) in these fields?

|__|__| AND |__|__|
YEARS MONTHS (IF APPLICABLE)

24. Have you ever worked in the architecture or engineering field?

YES 1
NO .... 2 [SKIP TO BOX 5]

25. How long (have you worked/did you work) in the architectural/engineering field?

|__|__| AND |__|__|
YEARS MONTHS (IF APPLICABLE)

DK 9898

BOX 5

Now I'd like to ask you some questions about your education background.

26. What is the highest level of education you have completed?

(CIRCLE ONE)

A. HIGH SCHOOL OR GED	1	[SKIP TO Q37]
B. VOCATIONAL, TRADE OR BUSINESS SCHOOL AFTER HIGH SCHOOL	2	[SKIP TO Q37]
C. COLLEGE OR UNIVERSITY		
LESS THAN 2 YEARS OF COLLEGE	3	[SKIP TO Q38]
2 OR MORE YEARS OF COLLEGE (INCLUDING 2-YEAR DEGREE)	4	[SKIP TO Q34]
COMPLETE COLLEGE (4- OR 5-YEAR DEGREE)	5	[SKIP TO Q31]
MASTER'S DEGREE OR EQUIVALENT	6	[SKIP TO Q29]
PH.D. OR OTHER ADVANCED PROFESSIONAL DEGREE	7	

27. What year did you receive your (Doctoral/advanced professional) degree?

19|__|__|
YEAR

28. What is the subject area of your (Doctoral/advanced) degree?

(CIRCLE ONE)

ENGINEERING	1
ARCHITECTURE	2
ENVIRONMENTAL SCIENCE	3
OCCUPATIONAL HEALTH/INDUSTRIAL HYGIENE	4
OCCUPATIONAL SAFETY	5
OTHER (SPECIFY)	6

____

29. What year did you receive your Masters degree?

19|__|__|
YEAR

30. What is the subject area of your Masters degree?

(CIRCLE ONE)

ENGINEERING	1
ARCHITECTURE	2
ENVIRONMENTAL SCIENCE	3
OCCUPATIONAL HEALTH/INDUSTRIAL HYGIENE	4
OCCUPATIONAL SAFETY	5
OTHER (SPECIFY)	6

31. What year did you receive your undergraduate college degree?

19|__|__|
YEAR

32. Is your undergraduate degree a BA, BS or some other degree?

BA	1
BS	2
SOME OTHER (SPECIFY)	3

33. What is the subject area of this degree?

(CIRCLE ONE)

ENGINEERING	1	[SKIP TO Q37]
ARCHITECTURE	2	
ENVIRONMENTAL SCIENCE	3	
OCCUPATIONAL HEALTH/INDUSTRIAL HYGIENE	4	
OCCUPATIONAL SAFETY	5	
OTHER (SPECIFY)	6	

34. Did you receive an Associates degree?

YES	1	
NO	2	[SKIP TO 38]

35. What year did you receive your Associates degree?

19|__|__|
YEAR

36. What is the subject area of your Associates degree?

(CIRCLE ONE)

ENGINEERING TECHNOLOGY	1
ARCHITECTURE TECHNOLOGY	2
ENVIRONMENTAL SCIENCE	3
INDUSTRIAL/PUBLIC HEALTH	4
APPLIED SCIENCE AND TECHNOLOGY	5
OTHER (SPECIFY)	6

____

37. Have you taken any college or university course work not related to asbestos that did not result in a college or university degree?

YES	1	
NO	2	[SKIP TO BOX 40]
DON'T KNOW	8	

38. What year did you last take course work not related to asbestos that did not result in college or university degree?

19|__|__|
YEAR

DK 98

39. What was the subject area of this course work?

a. ____________________
SUBJECT

b. ____________________
SUBJECT

c. ____________________
SUBJECT

40. At this point I'd like to ask you about any non-asbestos related technical training you've received. Did you ever attend school with the goal of obtaining a vocational or technical certificate or diploma?

YES 1
NO .... 2 [SKIP TO Q45]

41. Have you received a vocational or technical certificate or diploma?

YES 1
NO .... 2 [SKIP TO Q45]

42. What is the subject area, or areas, of your vocational/technical (certificate/diploma)?

a. ______________ [SUBJECT]	b. ______________ [SUBJECT]	c. ______________ [SUBJECT]

43. What year did you receive your certificate or diploma from this program?

a. 19 |__|__|	b. 19 |__|__|	c. 19 |__|__|
DK........ 98	DK........ 98	DK........ 98

44. How long, in weeks or months, was the course of study for this vocational/technical program?

a. |___|___| [NUMBER OF WEEKS]	b. |___|___| [NUMBER OF WEEKS]	c. |___|___| [NUMBER OF WEEKS]
OR	OR	OR
a. |___|___| [NUMBER OF MONTHS]	b. |___|___| [NUMBER OF MONTHS]	c. |___|___| [NUMBER OF MONTHS]
OR	OR	OR
a. |___|___| [NUMBER OF DAYS]	b. |___|___| [NUMBER OF DAYS]	c. |___|___| [NUMBER OF DAYS]
DK........ 98	DK........ 98	DK........ 98

45. Do you have professional certification as a:

		YES	What year was this certification obtained?	NO	DK
a.	Professional Engineer (P.E.), ...	1	19|__|__|	2	8
b.	Certified Industrial Hygienist (CIH), ...	1	19|__|__|	2	8
c.	Registered Architect, (R.A.), ...	1	19|__|__|	2	8
d.	Certified Safety Professional (CSP), or ...	1	19|__|__|	2	8
e.	Some other professional certification? ... (SPECIFY)____________________	1	19|__|__|	2	8

END

Those are all the questions I have. Thank you very much for your help.

OMB No. 2070-0034
Expires 8/31/90

[ID NUMBER]

U.S. ENVIRONMENTAL PROTECTION AGENCY

AHERA EVALUATION STUDIES

FORM N1: Notification Interview

May 1990

Public reporting burden for this collection of information is estimated to average 15 minutes, including time for hearing instructions, reporting information, and reviewing information.

Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to:

Chief, Information Policy Branch
U.S. Environmental Protection Agency
401 M Street, S.W. (PM-223)
Washington, DC 20460

and

Office of Management and Budget
Paperwork Reduction Project (2070-0034)
Washington, DC 20503

Westat, Inc.
1650 Research Boulevard
Rockville, MD 20850

AHERA
Form N1: Notification

Start time: ____________ am
pm

BOX 1

Hello, (RESPONDENT NAME), my name is (YOUR NAME). I work with Westat, a survey research firm in Rockville, Maryland and we obtained your name (when you sent us a postcard/from the PRINCIPAL'S NAME of SCHOOL'S NAME). I'm calling regarding a survey that we are conducting for the Environmental Protection Agency. The EPA has asked Westat to conduct a study to evaluate the asbestos in schools legislation, commonly called AHERA. The (SCHOOL NAME) was randomly selected for inclusion in this study, and we have no reason to believe that this school is out of compliance with this regulation.

Your help is essential because we cannot use anyone else in your place. The information you provide will not be identified with you or your school.

N1. I would like to be sure that we have recorded your name correctly. Is the correct spelling [SAY TITLE AND SPELL RESPONDENT'S NAME]?

YES	1	
NO	2	

(CORRECT SPELLING) ______________________________
(NAME)

____
(TITLE)

N2. At the time we spoke with the (PRINCIPAL'S NAME), we were told that you were a (PARENT/TEACHER) active in school matters. Is that accurate?

YES	1	**[SKIP TO N5 IF PARENT]** **[SKIP TO N8 IF TEACHER]**
NO	2	

N3. Would you please give me the name of a (PARENT/TEACHER) at (SCHOOL NAME) who is actively involved in extra curricular school matters?

YES	1	
NO	2	**[TERMINATE]**

N4. What is that person's name and telephone number, including the area code?

____
(NAME)

|___|___|___| - |___|___|___| - |___|___|___|___| **[TERMINATE]**
(AREA CODE) **(PHONE NUMBER)**

DK	8	**[TERMINATE]**

288

F PARENT:

N5. Which of the following best describes your activities in this school?

PTA officer	1	
Parent volunteer	2	[SKIP TO N7]
Committee member ______________	3	
OTHER ROLE (SPECIFY) __________	4	
______________________________		
PTA AND OTHER ROLE	5	

N6. What is your position in the PTA?

PRESIDENT	1
VICE PRESIDENT	2
SECRETARY	3
TREASURER	4
OTHER (SPECIFY) ______________	5
______________________________	

N7. How long have you been associated with (SCHOOL NAME)?

LESS THAN 1 YEAR	1
1-3 YEARS	2
4 or MORE YEARS	3

BOX 2

SKIP TO BOX 3

IF TEACHER:

N8. Which of the following best describes your nonteaching activities in this school?

Teacher's union representative	1	
Teacher volunteer	2	[SKIP TO N10]
Committee member	3	
OTHER ROLE (SPECIFY) __________	4	
______________________________		
TEACHERS UNION AND OTHER ROLE	5	

N9. What is your position in the teachers' union?

PRESIDENT	1
VICE PRESIDENT	2
SECRETARY	3
TREASURER	4
OTHER (SPECIFY) ______________	5
______________________________	

289

N10. How long have you been associated with (SCHOOL NAME)?

LESS THAN 1 YEAR	1	
1-3 YEARS	2	
4 or MORE YEARS	3	

BOX 3

My next questions are about notifications to parents of students in this school regarding activities relating to asbestos that have been performed in this school since December 1987.

N11. To the best of your knowledge, since December 1987, has the school or school board administration ever notified parents of students about any activities pertaining to asbestos in this school, such as a letter to parents, a meeting, or an article in the school newspaper?

YES	1	
NO	2	[SKIP TO BOX 8, PG 9]
DK	8	

N12. Since December 1987, have parents been notified more than once about activities pertaining to asbestos in this school?

YES	1	[SKIP TO N22, PG 6]
NO	2	
DK	8	

N13. In what month and year, since December 1987, were parents notified of activities pertaining to asbestos?

|__|__|, 19|__|__|
(MONTH) (YEAR)

DK	9898

N14. Were parents notified by the school:

		YES	NO	DK
a.	In a letter, notice, or publication regularly sent to parents (such as a school newsletter)?	1	2	8
b.	By a special letter, notice, or publication sent to parents specifically to inform them of school activities regarding asbestos?	1	2	8
c.	During a regular parent-teacher meeting, such as a PTA meeting?	1	2	8
d.	During a meeting called specifically to discuss asbestos in this school?	1	2	8
e.	In an official press release?	1	2	8
f.	In some other ways? (SPECIFY): ______________ ______________	1	2	8

BOX 4

IF ANY SHADED NUMBERS ARE CIRCLED IN N14, CONTINUE. IF ALL DK IN N14, SKIP TO N16. OTHERWISE, SKIP TO N17.

N15. Regarding the school meeting or meetings held, were minutes or written records later published or distributed?

YES	1
NO	2
DK	8

N16. Do you remember the contents of this notification?

YES	1	
NO	2	[SKIP TO BOX 8, PG 9]
DK	8	

N17. Did the notification contain:

		YES	NO	DK
a.	Information about the availability of a management plan?	1	2	8
b.	An announcement about the performance of the initial AHERA building inspection?	1	2	8
c.	A list of materials containing asbestos found in the school as well as the location of these materials, at the time of the initial inspection?	1	2	8
d.	An announcement of response actions, such as removal, encapsulation, enclosure of building materials containing asbestos or suspected to contain asbestos?	1	2	8
e.	An announcement of other actions regarding asbestos in the school? (SPECIFY): ________________	1	2	8
f.	General information about asbestos?	1	2	8

N18. Were there any reactions to the notification from parents such as:

		YES	NO	DK
a.	Requests to see the management plan?	1	2	8
b.	Requests for additional information?	1	2	8
c.	Requests for a special meeting to discuss asbestos in this school?	1	2	8
d.	Requests to add the topic of asbestos in this school to the agenda of a regular PTA or similar organization meeting?	1	2	8
e.	Withdrawal of children from classes in this school?	1	2	8

N19. Were there any other reactions from parents?

YES (SPECIFY)	1
________________________________	
________________________________	
________________________________	
NO	2
DK	8

BOX 5

IF NO SHADED NUMBERS ARE CIRCLED IN N18 OR N19, SKIP TO BOX 8, PG 9. OTHERWISE. CONTINUE.

N20. Would you say a few, some, many or all parents responded in some way to the notification pertaining to asbestos?

A FEW PARENTS	1	
SOME PARENTS	2	
MANY PARENTS	3	
ALL PARENTS	4	
DK	8	[SKIP TO BOX 8, PG 9]

N21. For parents who responded to the notification, would you say they expressed little concern, some concern, or considerable concern?

LITTLE CONCERN	1	[SKIP TO BOX 8, PG 9]
SOME CONCERN	2	
CONSIDERABLE CONCERN	3	
DK	8	

N22. How many times were parents notified about activities in this school pertaining to asbestos since December 1987?

|__|__|
(NUMBER OF TIMES)

DK 98

N23. **Beginning with the first notification, please give me the month and year in which parents were notified about activities in this school pertaining to asbestos since December, 1987. [VERIFY THAT ALL DATES LISTED ARE SINCE DECEMBER 1987]**

	DK
a. |__|__|, 19|__|__| (MONTH) (YEAR)	9898
b. |__|__|, 19|__|__| (MONTH) (YEAR)	9898
c. |__|__|, 19|__|__| (MONTH) (YEAR)	9898
d. |__|__|, 19|__|__| (MONTH) (YEAR)	9898
e. |__|__|, 19|__|__| (MONTH) (YEAR)	9898

N24 Were parents notified by the school:

		YES	NO	DK
a.	In a letter, notice, or publication regularly sent to parents (such as a school newsletter)?	1	2	8
b.	By a special letter, notice, or publication sent to parents specifically to inform them of school activities regarding asbestos?	1	2	8
c.	During a regular parent-teacher meeting, such as a PTA meeting?	1	2	8
d.	During a meeting called specifically to discuss asbestos in this school?	1	2	8
e.	In an official press release?	1	2	8
f.	In some other ways? (SPECIFY): ____________ ____________	1	2	8

BOX 6

IF ANY SHADED NUMBERS ARE CIRCLED IN N24, CONTINUE. IF ALL DK IN N24, SKIP TO N26. OTHERWISE, SKIP TO N27.

N25. Regarding the school meeting or meetings held, were minutes or written records later published or distributed by the school?

YES	1
NO	2
DK	8

N26. Do you remember the contents of any of these notifications?

YES	1	
NO	2	[SKIP TO BOX 8, PG 9]
DK	8	

N27. Did any of the notifications contain:

		YES	NO	DK
a.	Information about the availability of a management plan?	1	2	8
b.	An announcement about the performance of the initial AHERA building inspection?	1	2	8
c.	A list of materials containing asbestos found in the school as well as the location of these materials, at the time of the initial inspection?	1	2	8
d.	An announcement of response actions, such as removal, encapsulation, or enclosure of building materials containing asbestos, or suspected to contain asbestos?	1	2	8
e.	An announcement of other actions regarding asbestos in the school? (SPECIFY): ______________	1	2	8
f.	General information about asbestos?	1	2	8

N28. Were there any reactions to the notifications from parents such as:

		YES	NO	DK
a.	Requests to see the management plan?	1	2	8
b.	Requests for additional information?	1	2	8
c.	Requests for a special meeting to discuss asbestos in this school?	1	2	8
d.	Requests to add the topic of asbestos in this school to the agenda of a regular PTA or similar organization meeting?	1	2	8
e.	Withdrawal of children from classes in this school?	1	2	8

N29. Were there any other reactions from parents?

YES (SPECIFY)	1
NO	2
DK	8

____

____

____

____

BOX 7

IF NO SHADED NUMBERS ARE CIRCLED IN N28 OR N29, SKIP TO BOX 8. OTHERWISE, CONTINUE.

N30. Would you say a few, some, many or all parents responded in some way to the notifications pertaining to asbestos?

A FEW PARENTS	1	
SOME PARENTS	2	
MANY PARENTS	3	
ALL PARENTS	4	
DK	8	[SKIP TO BOX 8]

N31. From parents who responded to the notifications, would you say they expressed little concern, some concern, or considerable concern?

LITTLE CONCERN	1
SOME CONCERN	2
CONSIDERABLE CONCERN	3
DK	8

BOX 8

The next few questions are about notifications to teaching staff at [SCHOOL NAME] regarding activities relating to asbestos that have been performed in this school since December 1987.

N32. Since December 1987, has the school or school board administration ever notified teaching staff about any activities pertaining to asbestos in this school, such as a letter to teachers, a meeting, or an article in the school newspaper?

YES	1	
NO	2	[SKIP TO END]
DK	8	

N33. Since December 1987, have teaching staff been notified more than once about activities pertaining to asbestos in this school?

YES	1	[SKIP TO N43, PG 12]
NO	2	
DK	8	

N34. In what month and year, since December 1987, were teaching staff notified of activities pertaining to asbestos?

|__|__|, 19|__|__|
(MONTH) (YEAR)

DK 9898

N35. Were teaching staff notified by the school:

		YES	NO	DK
a.	In a letter, notice, or publication regularly sent to the school community (such as a school newsletter)?	1	2	8
b.	By a special letter, notice, or publication sent to teachers specifically to inform them of school activities regarding asbestos?	1	2	8
c.	During a regular parent-teacher meeting, such as a PTA meeting?	1	2	8
d.	During a school community meeting called specifically to discuss asbestos in this school?	1	2	8
e.	During a regular teachers' meeting?	1	2	8
f.	In an official press release?	1	2	8
g.	In some other ways? (SPECIFY): ____________	1	2	8

BOX 9

IF ANY SHADED NUMBERS ARE CIRCLED IN N35, CONTINUE. IF ALL DK IN N35, SKIP TO N37. OTHERWISE, SKIP TO N38.

N36. Regarding the school meeting or meetings held, were minutes or written records later published or distributed?

YES	1
NO	2
DK	8

N37. Do you remember the contents of this notification?

YES	1	
NO	2	[SKIP TO END]
DK	8	

N38. Did the notification contain:

		YES	NO	DK
a.	Information about the availability of a management plan?	1	2	8
b.	An announcement about the performance of the initial AHERA building inspection?	1	2	8
c.	A list of materials containing asbestos found in the school as well as the location of these materials, at the time of the initial inspection?	1	2	8
d.	An announcement of response actions, such as removal, encapsulation, enclosure of building materials containing asbestos or suspected to contain asbestos?	1	2	8
e.	An announcement of other actions regarding asbestos in the school? (SPECIFY): ____________ ____________________	1	2	8
f.	General information about asbestos?	1	2	8

N39. Were there were any reactions to the notification from teaching staff such as:

		YES	NO	DK
a.	Requests to see the management plan?	1	2	8
b.	Requests for additional information?	1	2	8
c.	Requests for a special meeting to discuss asbestos in this school?	1	2	8
d.	Requests to add the topic of asbestos in this school to the agenda of a regular teachers' meeting?	1	2	8
e.	Requests to change classrooms or transfer to a different school?	1	2	8

N40. Were there any other reactions from teaching staff?

YES (SPECIFY)	1

____

____

____

NO	2
DK	8

BOX 10

IF NO SHADED NUMBERS ARE CIRCLED IN N39 OR N40, SKIP TO END. OTHERWISE, CONTINUE.

N41. Would you say a few, some, many or all teaching staff responded in some way to the notification pertaining to asbestos?

A FEW TEACHING STAFF	1	
SOME TEACHING STAFF	2	
MANY TEACHING STAFF	3	
ALL TEACHING STAFF	4	
DK	8	[SKIP TO END]

N42. For teaching staff who responded to the notification, would you say they expressed little concern, some concern, or considerable concern?

LITTLE CONCERN	1	[SKIP TO END]
SOME CONCERN	2	
CONSIDERABLE CONCERN	3	
DK	8	

N43. How many times were teaching staff notified about activities in this school pertaining to asbestos since December 1987?

|__|__|
(NUMBER OF TIMES)

DK 98

N44. Beginning with the first notification, please give me the month and year in which teaching staff were notified about activities in this school pertaining to asbestos since December, 1987. **[VERIFY THAT ALL DATES LISTED ARE SINCE DECEMBER 1987]**

	DK
a. |__|__|, 19|__|__| (MONTH) (YEAR)	9898
b. |__|__|, 19|__|__| (MONTH) (YEAR)	9898
c. |__|__|, 19|__|__| (MONTH) (YEAR)	9898
d. |__|__|, 19|__|__| (MONTH) (YEAR)	9898
e. |__|__|, 19|__|__| (MONTH) (YEAR)	9898

N45. Were teaching staff notified by the school:

		YES	NO	DK
a.	In a letter, notice, or publication regularly sent to the school community (such as a school newsletter)?	1	2	8
b.	By a special letter, notice, or publication sent to teachers specifically to inform them of school activities regarding asbestos?	1	2	8
c.	During a regular parent-teacher meeting, such as a PTA meeting?	1	2	8
d.	During a school community meeting called specifically to discuss asbestos in this school?	1	2	8
e.	During a regular teachers' meeting?	1	2	8
f.	In an official press release?	1	2	8
g.	In some other ways? (SPECIFY):____________________	1	2	8

BOX 11

IF ANY SHADED NUMBERS ARE CIRCLED IN N45, CONTINUE. IF ALL DK IN N45, SKIP TO N47. OTHERWISE, SKIP TO N48.

N46. Regarding the school meeting or meetings held, were minutes or written records later published or distributed by the school?

YES	1
NO	2
DK	8

N47. Do you remember the contents of any of those notifications?

YES	1	
NO	2	[SKIP TO END]
DK	8	

N48. Did any of the notifications contain:

		YES	NO	DK
a.	Information about the availability of a management plan?	1	2	8
b.	An announcement about the performance of the initial AHERA building inspection?	1	2	8
c.	A list of materials containing asbestos found in the school as well as the location of these materials, at the time of the initial inspection?	1	2	8
d.	An announcement of response actions, such as removal, encapsulation, or enclosure of building materials containing asbestos, or suspected to contain asbestos?	1	2	8
e.	An announcement of other actions regarding asbestos in the school? (SPECIFY): ____________ ____________	1	2	8
f.	General information about asbestos?	1	2	8

N49. Were there any reactions to the notifications from teaching staff such as:

		YES	NO	DK
a.	Requests to see the management plan?	1	2	8
b.	Requests for additional information?	1	2	8
c.	Requests for a special meeting to discuss asbestos in this school?	1	2	8
d.	Requests to add the topic of asbestos in this school to the agenda of a regular teachers' meeting?	1	2	8
e.	Requests to change classrooms or transfer to a different school?	1	2	8

N50. Were there any other reactions from teaching staff?

YES (SPECIFY)	1
____________________	
____________________	
____________________	
____________________	
NO	2
DK	8

BOX 12

IF NO SHADED NUMBERS ARE CIRCLED IN N49 OR N50, SKIP TO END. OTHERWISE, CONTINUE.

N51. Would you say a few, some, many or all teaching staff responded in some way to the notifications pertaining to asbestos?

A FEW TEACHING STAFF	1	
SOME TEACHING STAFF	2	
MANY TEACHING STAFF	3	
ALL TEACHING STAFF	4	
DK	8	[SKIP TO END]

N52. From teaching staff who responded to the notifications, would you say they expressed little concern, some concern, or considerable concern?

LITTLE CONCERN	1
SOME CONCERN	2
CONSIDERABLE CONCERN	3
DK	8

END

Thank you very much for your cooperation with this questionnaire. The results will be used to assist in the evaluation of the asbestos regulation.

End time: ____________ am / pm

June 25, 1990
AHERA
Form M1: Management Plan Checklist

Start time: ____________ am / pm

Building ID(s)________________ Reviewer________________________ Review Date___________

General Inventory (10 pts.)

1c. Is a general inventory of school buildings present?

Yes	5	
No	0	[SKIP TO Q.4]

2c. Is the name and address indicated for each school building on the inventory?

All indicated	2
Most indicated	1
Some indicated	0.5
None indicated	0

3c. Is it indicated whether each school building listed contains friable ACBM, nonfriable ACBM, ACBM assumed to be ACM or no ACBM?

All indicated	3
Most indicated	2
Some indicated	1
None indicated	0

Exclusion/Inspection Information (66 pts.)

4. Check if the following are present:

Exclusions declared for inspections completed or for removal operations conducted before December 14, 1987?	( )
Inspection information for an AHERA inspection?	( )

3

BOX 1
REVIEW THE MANAGEMENT PLAN FOR EXCLUSION AND INSPECTION COMPONENTS. COMPLETE THE MANAGEMENT PLAN REVIEWER'S COMPARISON FORM THROUGH MP AHERA 1-7 CATEGORY.

5c. Does the management plan contain exclusion/inspection information?

Yes	5	
No	0	[SKIP TO Q. 19]

6c. Does the exclusion/inspection information contain

	ALL	MOST	SOME	NONE
a. Dates of inspection?	1	0.6	0.2	0
b. Name of each accredited person performing the inspection?	1	0.6	0.2	0
c. Signature of each accredited person performing the inspection?	1	0.6	0.2	0
d. Accrediting state?	1	0.6	0.2	0
e. AHERA accreditation number?	1	0.6	0.2	0

7c. Does the exclusion/inspection information contain a blueprint, diagram or written description of

	ALL	MOST	SOME	NONE	NA
a. Locations of homogeneous areas?	5	3	1	0	
b. Approximate square or linear footage of homogeneous areas?	5	3	1	0	
c. Exact sample locations (if sampling required)?	5	3	1	0	( )
d. Dates of sample collection (if sampling required)?	1	0.6	0.2	0	( )

8c. Does the exclusion/inspection information identify whether homogeneous areas are TSI, surfacing material or miscellaneous material?

In all areas	5
In most areas	3
In some areas	1
In no areas	0

3

9. Were samples collected as part of the inspection?

Yes	( )
No	( ) [SKIP TO Q.15]

10c. Is the method used to determine sample locations described?

For each homogeneous area	5
For most homogeneous areas	3
For some homogeneous areas	1
For no specific homogeneous area	0

11c. Is the manner used to determine sampling locations completely or substantially in accordance with AHERA for

	YES	NO	NA
a. TSI?	2	0	( )
b. Surfacing Material?	2	0	( )
c. Miscellaneous Materials?	1	0	( )

12c. Is the following information present for inspectors who collected bulk samples?

	YES	NO	NA
a. Name of inspector?	1	0	( )
b. Signature of inspector?	1	0	( )
c. Accreditating state?	1	0	( )
d. AHERA accreditation number?	1	0	( )

13c. Is the following information regarding bulk sample analysis present?

	ALL	MOST	SOME	NONE	NA
a. Copies of analyses	5	3	1	0	
b. Dates of analyses	1	0.6	0.2	0	
c. Name(s) and address(es) of laboratory(ies)	1	0.6	0.2	0	
d. Statement(s) of laboratory accreditation	2	1	0.5	0	( )

14c. Are the name and signature present for persons who performed analyses of the bulk samples?

All	2
Most	1
Some	0.5
None	0
NA	( )

---

15. Is any friable or friable assumed ACBM or TSI reported in the exclusion/inspection information?

YES ....( )
NO..( ) [SKIP TO Q.24]

16c. Are written assessments present for friable ACBM, friable assumed ACBM, nonfriable material which is newly friable and/or TSI?

All	5	
Most	3	
Some	1	
None	0	[SKIP TO Q.19]

17c. Do the written assessments in Q.16 provide

	YES	NO
a. Signature of the assessor?	1	0
b. Date of signature?	1	0
c. Accrediting state?	1	0
d. AHERA accreditation number?	1	0

18c. Are reasons given for each assessment?

For all	5
For most	3
For some	1
None	0

Response Action Recommendations (30 pts.)

Box 2
REVIEW RECOMMENDED RESPONSE ACTIONS AND COMPLETE THE MANAGEMENT PLAN REVIEWER'S COMPARISON FORM

19c. Are there written recommendations to the LEA regarding response actions for friable homogeneous areas and TSI?

All	10	
Most	6	
Some	2	
None	0	[SKIP TO Q.22]

20c. For the management planner who made the recommendations in Q.19, is there

	YES	NO
a. Name?	1	0
b. Signature?	1	0
c. Date?	1	0
d. Accreditating state?	1	0
e. AHERA accreditation number?	1	0

21c. For the response actions recommended, are there

	ALL	MOST	SOME	NONE
a. Methods described to be used for preventive measures and response actions?	5	3	1	0
b. Locations specified where such actions and measures will be taken?	5	3	1	0
c. Schedules for beginning and completing each preventive measure and response action?	5	3	1	0

[Question 22c. intentionally excluded]

Activity Plans (39 pts.)

23c. Are activity plans or statements present for

	YES	NO
a. Reinspections?	5	0
b. Periodic surveillance?	5	0
c. O&M plan?	10	0
d. Management planner recommendation for initial and additional cleaning?	5	0
e. The LEA response to initial cleaning recommendation?	3	0
	[SKIP TO Q.25]	

24c. Are activity plans or statements present for

	YES	NO	NA
a. Reinspections?	14	0	( )
b. Periodic Surveillance?	14	0	( )

25c. Are steps described by which workers and building occupants, or legal guardians, will be or have been notified about

		YES	NO
a.	Inspections/reinspections?	2	0
b.	Response actions?	2	0
c.	Post-response action activities, including periodic surveillance and reinspections?	2	0
d.	Availability of management plan?	5	0

Resource Evaluation (10 pts.)

26c. Is an evaluation of resources needed to complete the response actions and carry out reinspections, O&M, periodic surveillance and training present?

Yes	5	
No	0	[SKIP TO Q.28]

27c. Does the resource evaluation take all activities listed in Q23/Q24 and all recommended actions into account?

All	5
Most	3
Some	1
None	0

ADP (6 pts.)

28c. Are the following items provided regarding the LEA's designated person?

		YES	NO
a.	Name	2	0
b.	Address	1	0
c.	Phone Number	1	0
d.	Training received	1	0
e.	Sign-off that LEA responsibilities under AHERA have or will be met	1	0

AIR SAMPLE CLEARANCE RESULTS

BOX 3
REVIEW THE CLEARANCE AIR SAMPLE RESULTS (IF ANY) SUBMITTED IN THE MANAGEMENT PLAN PACKAGE. ANSWER THE FOLLOWING QUESTIONS.

29a. Were clearance air sample results submitted with the management plan package?

Yes	1	
No	2	[SKIP TO Q31]

30. Was the method of analysis of the clearance air samples

	YES	NO	DK
a. Transmission Electron Microscopy (TEM)?	1	2	8
b. Phase Contrast Microscopy (PCM)?	1	2	8

USABILITY

31u. Are the following items, which may enhance usability, present?

	YES	NO
a. Table of Contents - basic	1	2
b. Table of Contents - detailed	1	2
c. Headings for Table of Contents used consistently in text	1	2
d. Pages are numbered	1	2
e. Definitions section	1	2
f. Narrative(s) which describe sections	1	2
g. Program Organization Chart	1	2

h. List other items which enhance the usability of this management plan.

i. List items which detract from the usability of this management plan.

32u. Could the Management Plan be used and understood, without prior instruction, by persons with

a.	Less than high school diploma?	1
b.	High school diploma?	2
c.	An advanced degree beyond high school?	3

33u. Could the Management Plan be used and understood, without prior instruction, by persons with

		All	Most	Some	None/Few
a.	Knowledge of the school's buildings?	1	2	3	4
b.	AHERA asbestos inspection experience?	1	2	3	4

34u Are the following terms used correctly, as defined by AHERA, in the MP?

		YES	NO	NA
a.	Homogeneous Area	1	2	( )
b.	Functional Space	1	2	( )
c.	Exclusion	1	2	( )
d.	Random Sampling	1	2	( )

End time: ______________________ am / pm

Form M2: Management Plan Comparison Report

```
                                                                                                DATE: 05/14/90
                                                                                                PAGE:        9

SCHOOL  :  03020                 HIGH SCHOOL        PSU       : A240
BUILDING:      01  MAIN BLDG                        SAMPLE ID: P036


WESTAT MATERIAL: M06. VXY MICROMOLEIICT
           TYPE: 302. Ceiling tile - glue-on
  TEXTURE/COLOR:  42. White                                                     MP              RESPONSE ACTIONS RECOMMENDED
                                     MP AREAS                                      MP           AHERA           .      APPROPRIATE RESPONSE
WESTAT AREAS                        (CHECK IF   WESTAT       MP          MP        MATERIAL     CATEGORY        .      .      BEYOND AHERA
ID  ROOM                      LEVEL  PRESENT)   QUANTITY     QUANTITY    SAMPLES   ASSESSED?     (1-7)          .      .      .      RESPONSE
--- ------------------------- -----  --------   ----------   ----------- -------   ---------    --------        ---    ---    ---    --------
015 STAIRWAY                    B      ---         6.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
048 BOY'S LOCKER               F01     ---        21.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
049 GIRL'S LOCKER              F01     ---        16.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
050 OFFICE                     F01     ---        48.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
053 HALLWAY                    F01     ---        47.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S

076 CLASSROOM                  F01     ---       312.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
083 STAIRWAY LANDING           F02     ---        33.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
084 STAIRWAY LANDING           F02     ---        33.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
086 CLASSROOM                  F02     ---         1.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
087 CLASSROOM                  F02     ---        27.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S

108 CLASSROOM                  F02     ---        11.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
111 HALLWAY                    F02     ---        67.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
112 CLASSROOM                  F02     ---       113.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
113 CLASSROOM                  F02     ---        37.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
114 CLASSROOM                  F02     ---        64.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S

115 CLASSROOM                  F02     ---        47.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
118 CLASSROOM                  F02     ---        39.0 SF    -------- --    |      Y  N  NA       ----          Y N    Y N    Y N    G S
                                              ==========   ===========    |      =========    ========        ===    ===    ===    ========
TOTAL:                                           922.0 SF    -------- --    |      Y  N  NA     Y  N  NA        Y N    Y N    Y N    G S
                                                                            v
---------------------------------------------------------.----------------------------------.-------------.-------------.----------------------------.
PP NO.        : --------                                 | # SAMPLES COLLECTED : ______     | MP APPRO-   | MP APPRO-   | RESPONSE ACTION            |
                                                         | CORRECT? (AHERA MIN): Y  N       | PRIATE?:    | PRIATE?:    | RECOMMENDED:               |
DESCRIPTION   : ______________________________           | EXCEEDS AHERA?      : Y  N       |   Y  N      |   Y  N      | -------------------------  |
PP TYPE       : T  S  M   ___ NOT INDICATED              | BULK SAMPLE RESULTS : A  P  N    | (IF NA,     | (IF NA,     |                            |
TYPE CORRECT?: Y  N  AU                                  | (IF NEG, STOP ROW)               |  STOP ROW)  |  STOP ROW)  |                            |
========================================================  ================================  ============  ============  ============================
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APPENDIX B

PARENT AND TEACHER NOTIFICATION

FOCUS GROUPS

DISCUSSION GUIDE AND FINDINGS

Part 1: Discussion Guide

Part 2: Findings

Appendix B presents the discussion guide and findings of the parent and teacher notification focus groups held for the AHERA evaluation. These groups were conducted with parents and teachers from schools in four locations nationwide.

Part I

A discussion guide presents a starting point for group discussions and is not a formal questionnaire. Unlike a questionnaire which must be administered in the same exact manner each time it is used, a discussion guide provides topics for the moderator to discuss using whatever phraseology he/she is comfortable with in the context of the ongoing discussion.

The following presents the discussion guide that was used during the parents and teachers focus groups.

July 1990

FOCUS GROUP GUIDE FOR NOTIFICATION FOCUS GROUPS

Introduction

- *Introduce yourself, the concept of focus groups, AHERA, the new asbestos law, and the evaluation. Explain 3 steps - inspection, maintenance plans and response to any asbestos found.*
- First, I'd like to say that everything you say during this discussion will be held confidential. Following standard focus group procedures, this session is being taped to make it easier for me to write a report. Also, following standard focus group procedures there are observers behind the mirror. The mirror is there just so the observers don't interfere with our discussion.
- *Reassure parents and teachers that the group's findings will be held confidential, and that none of the examples given during the group pertain to the individual schools with which respondents are associated.*
- What is your first name and what is your role at the school with which you are associated? *(Remind them not to mention school name.)*

Asbestos in Schools

Q ▪ Does your school have asbestos currently?

Q ▪ Was asbestos found in a recent inspection for asbestos?

Q ▪ Did you ever receive a notification about asbestos in your school? *[Probe for letter, newsletter, posted on a school bulletin board or in a meeting.]*

  - What did it contain? *[Probe for locations of ACM in school.]*
  - How were you notified?
  - Was there any parent/teacher reaction to the notification?

Q ▪ Do you know if your school has a Management Plan?

  - Were you informed it was available for review?
  - Have you ever reviewed your school's Management Plan? Do you know anyone in a position like yours who reviewed your school's Management Plan?
  - Do you know where Management Plan is located? *[Probe for availability, access to updated version.]*
  - How easy did you find it to understand?
  - What did your Management Plan contain?
  - Was the Management Plan available in a second language?

Examples of Notifications

- *West Township notification example will be handed out and discussed.* [1] *The moderator will ask questions about what respondents think their reaction to this type of notification in their school would have been.*
  - Does this notification give you as much information as you would want from a notification?
  - Would you call the school or someone else to discuss this notification?
- *South Community notification example will be handed out and discussed.* [2]
  - Does this notification give you as much information as you would want from a notification?
  - Would you call the school or someone else to discuss this notification?
- *North Community notification example will be handed out and discussed.* [3]
  - Does this notification give you as much information as you would want from a notification?
  - Would you call the school or someone else to discuss this notification?
- Now that you have seen these three types of notifications how would you compare your reactions to them?

Q

- What elements of a notification do you think are most critical for parents or teachers to feel appropriately informed?
  - *Name of responsible person;*
  - *Telephone number of responsible person;*
  - *Description of the AHERA law;*
  - *Name/qualifications of inspection company or lab;*
  - *Explanation about friability;*
  - *Description of the findings of the asbestos inspection (locations/condition); and*
  - *School responses to asbestos found;*
  - *Health risks of asbestos.*

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[1] West Township Example is a "minimalist" notification, barely fulfilling the requirements of AHERA.

[2] South Community Example fulfills the requirements of AHERA and contains information on the response action planned but not the location of materials found.

[3] North Community Example fulfills the AHERA requirements and presents information on where asbestos is located in the school.

If There Is Time

- How you think parents and teachers would reaction to different methods of dissemination such as:
    - Hand carried letters;
    - Notice posted on school bulletin board;
    - Letters either mailed with other materials or mailed alone;
    - Notification in a PTA meeting;
    - PTA president's being notified by mail; and
    - Notification through a school newsletter. *(Appletree example).*
- How different do you think that retention of these notifications might be with these different methods of distributing the information?

Thanks and Conclusion

- *Thank you for agreeing to participate in this group. As we said any examples we have used do not relate to the specific schools in which you work. Anything that you have told us will only be reported on using your first names.*
- *Goodbye.*

Part II

The following section presents the findings of the focus group discussions held with parents and teachers in four locations nationwide. These focus groups posed questions to parents and teachers from various schools throughout the four locations. Participants were recruited based on working in or being a parent of children in a school built before 1975, which serves children in some of grades 1 through 12. Special efforts were not made to recruit actively involved parents or teachers. Opinions about the adequacy of the various notification examples and contents reflect parent and teacher beliefs, rather than EPA or Westat judgments about adequacy.

The letters used as the basis for discussion about reactions to different types of notification are appended to this section.

NOTIFICATION FOCUS GROUP

St. Louis, Missouri

Date: July 9, 1990

Attending: Six parents, all women, and four teachers, two of whom were also parents of school age children. One teacher was a man. One teacher worked in a Catholic school; the remainder were affiliated with public schools in the St. Louis, Missouri area.

Previous Knowledge of Asbestos

The initial topics of group discussion were knowledge about the presence of asbestos in participants' school and knowledge of whether or not the school had been inspected for asbestos within the last two years. A total of seven group participants knew whether asbestos was in their school, and all of the teachers knew this fact. By contrast only five participants knew about an inspection for asbestos performed within the last two years. The others knew the asbestos status of their school from hearsay, or from previous asbestos inspections.

When asked about receiving notifications of the asbestos status of their schools, all of the parents (including those who were also teachers) remembered being notified, and three of the four teachers remembered being notified. One teacher had to sign a statement that she had been informed of the asbestos status of her school. One participant described her notification as follows:

> *"It was a letter, but worded in legal language ... It simply stated that asbestos has been found in these areas in the school, and that the school would be working in compliance with the Management Plan."*

All but one of those who remembered being notified stated that their notifications *"mentioned the areas of specific concern,"* i.e., the areas in which friable, or at least accessible or damaged friable asbestos had been found.

When asked what their reactions had been to these notifications, all said that they had not reviewed the Management Plan or reacted in any other significant way.

> *"The letter outlined things so you knew what the problem was, and you knew what they were doing so you didn't have any questions ... They covered all these grounds ... We're trusting in the district that they are handling it, and they are doing the things that they say they are doing."*

Five participants had heard about their school's Management Plan, though none had reviewed it. All said that they felt welcome to look at it if they had chosen to do so, though only one person knew where the Management Plan was located. The other participants stated that they would have a *"good guess"* of where to start in looking for the Plan, and that they were sure that they could find it to review if they wanted to.

Examples

Three examples of notification letters were distributed to the group for their reaction. Each letter presented a different degree of information about asbestos inspection, location of ACM, and designated person information. Examples of these letters are in attachment B-1.

The West Township example was widely felt to be *"unclear"*, and to be obscuring the actual findings in the school. Eight people said that they would call the school if they had received this letter, and there was general agreement that there would be *"a stir"* if this letter was sent to parents.

Concern was also expressed that the designated person was not school-based, and therefore would be speaking only from *"hearsay"* rather than direct knowledge of the school's situation, which illustrates lack of knowledge of the role of the designated person. Other participants worried that as the designated person was a *"supervisor"*, it would not be possible to reach him by telephone to ask for information.

One person expressed distress that the format of this notification was a memo rather than a letter. She felt that a memo was more impersonal and cold than a letter, and that a letter was more suited to the notification process than a memo.

The South Community example was received much more positively by this group than the West Township example had been.

> *"I get a good feeling from reading this. It's to the point, it's thorough* [and] *it has specifics. If I were a parent I'd feel very comfortable with what has been done and what will be done ...* [by the South Community School District.]

The word "compliance" in the phrase "In compliance with the U.S. Environmental Protection Agency regulation" was felt to be very positive, particularly in comparison to the word "pursuant" which had been used in a similar context in the West Township example.

Several parents also voiced approval of the South Community definition of the word "friable."

Several other parents and teachers, however, expressed a different perspective; *"My initial reaction would be 'does my school have it?'... So I'd still have to make a phone call."* These parents and teachers wanted to know if their school had asbestos, and possibly even where it was located.

About half of the group said that if they received the South Community notification letter they would call either the principal or someone else at the school to learn more about the school's asbestos situation. These parents generally felt that the notification should be school rather than school district based, and that they would be more comfortable if they had received a letter from the principal rather than the designated person. In general, participants stated that principals were accessible and knowledgeable in contrast to the unknown and somewhat distrusted ADP.

The North Community example was generally felt to be *"too long."* Indeed the moderator was required to encourage the group to finish reading this letter, rather than to begin discussing it without having fully read it. As several people said,

> *"I don't have time to read this."*
>
> *"It's longer than one page."*

Others however, disagreed about the length being too long.

> *"I think that its real clear, and it gets it down in everyday language ... Even though its lengthy, if you have a person who is really concerned, they will spend the time with it ..."* while others may not read all of it.

One person even thought that the fact that the letter was so long showed that it was *"important"*.

When asked if they would read the whole letter, everyone said that they would.

Only one person said that she would call the school or district about this letter. When the moderator asked her what she would inquire about during this call, she said that she would want to know the time frame for the school's proposed response actions.

One person thought that the North Community example *"would be inflammatory"* as once they were given this much information, PTA members would want more and more information on location, condition, and health-related information on the asbestos found in the school. She said that her school would never send such a letter to parents, and seemed to think that was appropriate.

Considerable discussion was raised about the North Community notification's reference to the periodic reinspection of the school. This group thought that a reinspection every six months was inadequate, and that *"lots can happen in six months, lots."*

Comparison Between Examples

This group as a whole overwhelmingly preferred the South Community example. All of the teachers preferred it, and only one of the parents preferred the North Community example. Some of those who preferred the South Community example wished it had contained a few more specifics of asbestos locations like those that were listed in the North Community example.

Outline for Future Notifications

When asked what the contents of an ideal notification would be, the following items were mentioned by one or more people:

- Letter as opposed to a memo format;
- Definition of friability;
- Information on asbestos not posing a health hazard;
- Availability of a school-based asbestos resource person in the school;
- Explanation of and reassurance that appropriate response actions were being undertaken;
- Timetable for the response action; and
- Statement that the school was in compliance with the regulation.

Several people also voiced a request for the letter to be *"reassuring"* to parents.

When asked by the moderator about the importance of specific items being included in future notifications, the following priorities emerged:

- **Name of a designated person.** One person thought that the name of a district level designated person should be presented in the notification, and nine thought that the name of a school-based designated person should be presented. Most of these nine thought the principal should be the school's designated person.
- **Designated person's telephone number.** Eight participants thought that the designated person's telephone number should be presented in the notification.
- **Description of the law.** Four participants thought that a general description of the law, or at least a statement that the school was in compliance with the law, should be included in the notification.
- **Name of the inspection company.** None of the participants thought that the name of the company performing the inspection of the school was important or should be presented in the notification letter.
- **Definition of key terms.** All participants thought that the key terms presented in the notification (e.g., friability) should be defined within the letter.

- **Location of asbestos-containing building materials.** When directly asked, none of the participants in this group stated that they thought the location of the asbestos-containing building materials in the school should be included in the letter. Some, however, thought that the letter could contain a brief description of areas of particular concern.
- **Response actions planned.** Three participants thought that the notification should include a description of the school's planned response actions and the timetable for these actions.

Method of Distribution

Both parents and teachers in this group responded overwhelmingly in favor of notification letters being mailed to parents in a dedicated mailing. These participants thought that by sending a notification in this way, the school was doing the maximum to ensure that parents were informed, and that the school recognized that the notification was an important topic. With regard to other notification techniques the group stated:

- When letters are sent home with children you are *"lucky if 50% arrive."* Moreover, *"there are some kids that would read this and freak out, and say 'that's it, Mom, I refuse to go to school.'"*
- Bulletin boards were felt to be too public, and frequently not read.
- Notification either of PTA/PTO presidents or of parents through PTA/PTOs were considered inappropriate. These organizations were not the correct avenue for notification as not enough parents participate, and these organizations do not have the budget or the mandate for this type of notification.
- Notification through newsletters, as in the Appletree example (distributed to the group as an example of a newsletter notification), was thought to be an acceptable supplemental notification, but inadequate as primary or sole notification of the asbestos status in the school.

In conclusion, the group strongly felt that the most effective way to notify parents of the school's asbestos status was through a dedicated mailing of a letter notifying the parents of the findings of the school's asbestos inspection.

NOTIFICATION FOCUS GROUP

Boston, Massachusetts

Date: July 12, 1990

Attending: Five parents (one of whom was on what is commonly called the district's school board, and two of whom were PTO office holders) attended this group. In addition six teachers, three of whom were also parents of school-age children, attended. All of the participants were women, with the exception of one teacher who was also a parent. All were affiliated with public schools in the Boston, Massachusetts area.

Previous Knowledge of Asbestos

The level of knowledge about the asbestos situation in the schools represented by the participants was very low. When asked if the school with which they are associated had asbestos, several people said, "*No*", only to revise their statements as the discussion progressed by saying that they had been told that asbestos in their school was at "*safe levels*". Two women initially answered that the schools their children attended were "*too new*" to contain asbestos, but upon questioning by other group members these women admitted that the schools had been built in the mid to late sixties. These women then learned through other, better informed participants that both schools might indeed have asbestos.

Those who did know something about the asbestos status of their schools seemed to do so more through hearsay than through official notification. The only participants who firmly remembered being notified in any formal manner were two of the four teachers. One of the other teachers thought that perhaps the superintendent had told them about asbestos in their school at a meeting, though she did not remember this clearly.

During this discussion the member of the district's school board stated,

> *"After the schools were inspected for $100,000, "We then had to go and allocate another $100,000 to do this study because there was something in the law that said you had to do it yearly* [reinspect.] *I remember it ticked me off because you knew where you were at and you shouldn't have to keep this process going for ever."*

Examples

Three examples of notification letters were distributed to the group for their reaction. Each letter presented a different degree of information about asbestos inspection, location of ACM, and designated person information. Examples of these letters are in attachment B-1.

The West Township example elicited considerable concern and even some anger. Immediately upon reading the notification participants zeroed in on the fact that,

> *"I think that they should have told you what the results were."*
>
> *"It strikes me that if it came out and it was a good report they would have said something about it,"* i.e., the findings in this school district probably were quite negative.

Over half of the participants in this group expressed continual questions about the location of the asbestos found during the inspection, and why this information was not included in the West Township example.

When asked about the strengths of the West Township example, one person said, *"It brings it* [the asbestos inspection] *to your attention that you may want to then find out more ... It lets you know who to contact to get more information."*

The reaction was, however, on the whole quite negative. As one participant said,

> *"As a teacher* [the contents of this notification are] *easy because you then go to the office and say 'what was the result?' As a parent its a completely different situation because I think it is a burden to ask each parent to call the office and find out what's going on."*

One participant was even more vigorous in her denunciation of the West Township notification, stating,

> *"I personally can't stand this because of rumors. I can't stand this whole letter because this is like a trigger to make everybody go 'Oh my God, Oh my God.' You either have a problem or you don't and this letter raises questions, without presenting any answers."*

One participant thought that the notification could easily have been improved.

> *"An additional sentence in here could have allayed any fears that parents have at all ... 'The findings in such and such a school were acceptable.'"*

Despite the overall negative reaction from this group, one participant did, however, admit that most people would not react in any significant way to this notification: *"You see that there was an inspection and you see 'has complied' and a lot of people would toss it* [the letter]."

The South Community example was greeted less negatively, but participants still thought that,

> *"I would want to know which schools have the problem and how they are going to deal with it, and when they are going to deal with it."*
>
> *"The letter should be "a little more specific than this ...* [It] *should be more specific to the school."*
>
> *"I would be on the phone immediately to find out how my school related and, if they were going to be doing anything to treat the asbestos, when they would be doing it."*

On the whole, however, the South Community notification was thought to be *"better than the first one,"* though it would be better still as a *"cover form for each school to attach their own communique to, outlining specifically what was found in that school."*

When asked if they would call the school after receiving this letter, six participants said that they would call. One who said he would not call stated,

> *"I would guess that most people, which may not be the people around this table ... would not read this and would be trusting ... 'Yes, it was found and they have a plan for it and they'll take care of it and so now I don't have to worry about it.' If there are 200 parents maybe 10 to 15 would call."*

When asked to summarize their reactions to this notification several of the participants in this group stated that: *"This letter makes you feel more comfortable ... the only thing it should have added is the findings in each school."* The only specific item that this group could list as contributing to this comfort was the presence of a definition of the term "friability".

Reaction to the North Community example was more positive than to either of the other two, though only marginally so. It is difficult to separate out whether some of the reactions in this group were to specific components of the notification (e.g., participants did not like the fact that in this example custodians would be performing the removal of ACBM) and whether they were to the overall design of the notification. The participants did say, however,

> *"It certainly gives a lot more information, but boy am I mad - first to require the custodians to remove the asbestos, its cruel and unusual punishment, and second to expect people to pay"* $15 for a copy of the Management Plan.
>
> *"It's telling you what there is to tell you. You may disagree with something but they are telling you what they are doing."*

One person expressed concern that the level of detail and length of the letter would make it very hard for a non-native English speaker to comprehend. A teacher then said that the letter would be sent out in Spanish if her school knew about the potential language problem, even if the child were in a standard classroom rather than a bilingual program.

One parent summarized the group's reactions by saying: *"I like this better than the other two because the second page is specific ... It's telling you what's happening, what they are planning to do, and where the problems are."*

When asked if they would call the school or the designated person after receiving this letter, only one person said yes. She said she would question the appropriateness of the custodians' performing the response actions, but other than that would not have any questions about the letter. All present agreed, however, that they would call the school to ask for more details if their child were a student in one of the classrooms with asbestos listed on the second page of the letter.

Outline for Future Notifications

The elements listed by the participants in this group as important to a notification include:

- Information on asbestos locations specific to the school;
- Time frame for response actions;
- Name and phone number of someone to call for additional information;
- Short summary of the AHERA act and any standards it contains;
- Explanation of the health risks of asbestos;
- Description of the inspection process, an explanation that *"An agency has gone through each and every room and fine combed it for asbestos"*; and
- Report on the planned response actions in each school.

In general, this group was extremely interested in having a short and to the point, school-based notification. Ideally, this notification would present the locations, conditions, and planned responses to asbestos in each school, though in the very compressed space of one to two pages of text.

One interesting suggestion to emerge from this group was the idea that the superintendent should run school-by-school meetings on the topic of asbestos in each school. This parent thought that this type of meeting would be very important to increase parental understanding of the asbestos issue in schools. The notification letter could then contain information on the upcoming meeting as well as some of the specific items listed below, the importance of which were discussed by the participants:

- **Name of a designated person.** All eleven participants thought that this was an important element in a notification.
- **Designated person's telephone number.** All present thought that this was important.
- **Description of the law.** Eight people though that a brief description of the AHERA regulation should be included in all notifications.

- **Name of the inspection company.** Ten people wanted to know something about the inspection company. Several people said that knowing the company was *"certified"* would be adequate, others thought a statement as to the training of the inspectors would be adequate.

- **Definition of key terms.** All eleven people thought that a definition of key terms such as friability should be included in the notification. During the earlier discussion of the examples, a question was also raised about the meaning of the terms TSI, Surfacing and Miscellaneous, which should be defined if they are used.

- **Location of asbestos-containing building materials.** Ten participants thought that the location and description of the ACBM in the school should be included.

- **Response actions planned.** All of the participants expressed a considerable interest in what response actions would be undertaken, and believed that this information should be included in the notification. All of the participants also thought that the time frame for these response actions should be included.

- **Health risks of asbestos.** Nine participants thought that a brief description of the health risks of asbestos should be included in the notification.

Method of Distribution

Financial constraints in this community's school system more or less removed the possibility of mailing the notification letters to parents. For this reason, discussion centered more on the different ways that notifications sent home with children can be assured of reaching their destination. The group as a whole agreed that *"if money were not a problem, then that* [direct mailing of notifications to parents] *is the way to do it."* Other topics of discussion included the following:

- Over half of the participants in this group stated that the superintendent of schools should conduct a press conference either before or immediately after notification letters were sent out. This press conference would ensure *"that the information is correctly quoted in the newspaper."*

- Some discussion occurred on the desirability of notifying parents in a newsletter that an *"important notice"* regarding asbestos would be sent home with the child on a certain date. Some people thought that this type of pre-notice would ensure that parents asked for the notification from their child, while others thought *"you are then setting everybody up to say 'when is this important notice coming?'"* No consensus was reached on this topic.

- Notification through PTA or PTO meetings was considered inadequate as "*not enough people attend.*" Moreover the PTA office holders did not want the responsibility for notifying parents.

- Notification through school newsletters was thought to be inappropriate, and certainly the Appletree example, distributed to the group as an example of a notification by newsletter, was considered to be inadequate. "*No way, this opens a can of worms ... I'd rather have nothing than this,*" said several parents about the Appletree example.

In conclusion, the group as a whole thought that the only method of notification possible in their school system was for the letters to be sent to parents through children, though in a more ideal world, these notifications would be sent to parents in the mail.

NOTIFICATION FOCUS GROUP

Seattle, Washington

Date: July 16, 1990

Attending: Five parents, all of whom were women, and four teachers, two of whom were also parents of school age children. One teacher was a man. All participants were associated with public schools in the Seattle, Washington area.

Previous Knowledge of Asbestos

The parents in this group knew very little about the asbestos status of the school with which they were associated, while all four teachers believed that they did know the current status of asbestos in their school. No one in the group recalled being informed through a formal notification process, while the teachers had gained their knowledge through in-person contact with asbestos inspectors or removers working in the school.

One teacher in a small parochial school had been part of a volunteer effort to remove floor tiles in her school. She said that after they had done the job she heard something about the material or glue being asbestos. This incident occurred within the last two years, and was not preceded by any training or notification.

This participant was, however, involved in an awareness type training about asbestos, conducted by the Lutheran Teachers Council, of which she was a member. No other teacher had received any type of training about asbestos from any school or school-related source.

None of the participants in the group had reviewed or heard of their school's Management Plan.

Examples

Three examples of notification letters were distributed to the group for their reaction. Each letter presented a different degree of information about asbestos inspection, location of ACBM, and designated person information. Examples of these letters are in attachment B-1.

Reaction to the West Township example was overwhelmingly negative.

> *"It doesn't tell me anything."*
>
> *"I'd probably panic if I read it, and want to go find out what the results in my school were and what they were going to do about it, and how bad it is. It would trigger me to make several phone calls."*
>
> *"I'm going to start asking lots of questions."*
> *"I feel my time would be wasted with this letter ... First off I'm frustrated because it tells me nothing. Second off I'm angry because they wasted my time and told me nothing."*

Other parents expressed misunderstanding of or dislike for some of the contents of the notification, stating,

> *"I'm going to assume that there has been a problem* [after reading this letter] *because they have developed a plan ... Why would you need a Management Plan if you didn't have a problem?"*
>
> "'Pursuant,' *what does that mean?"*

Only one teacher, who was also a parent, did not find the West Township example objectionable. She also expressed such overwhelming confidence in her school district that she would have been comfortable not being notified at all. She said,

> *"I suppose it depends on how much faith you have in your school district. I say 'great, they must have taken care of it, my kids are safe.' That's the way I look at it as a parent. As a teacher I say 'good, my school's safe' ... My job is to teach the children and I don't really need to be bothered with it. Now as a parent if there is a a hazard to my children yes, but I stick with 'I trust my district'."*

In general the concerns about the West Township example were that it did not actually notify parents and teachers of the results of the inspection, nor did it say what would be done in response to the inspection.

Of the assembled group, seven people said that they would call the school after receiving this notification. The two who said that they would not call the school were the very trusting teacher quoted above, and a teacher who said he would simply ask someone at the school for more detail after receiving this letter.

The South Community example was generally thought to be *"much better than the other one,* [it] *gives much better information."* One parent said as an apparent compliment to the South Community example, *"This one is going to pacify me right there."*

None of the parents said they would call the school after receiving this notification, though several said that they would ask *"casual"* questions about it when they got a chance.

When asked what they liked about this example they said that it was friendly, brief (as one person volunteered, *"nobody reads two pages")* and signed by the AHERA designated person.

When asked about the weaknesses of this notification the group raised the following questions:

"What are the [response] *measures to be taken?"*

"Are they going to close off certain areas" of the school for response actions?

"It doesn't tell about health risks" of asbestos.

The North Community example was generally felt to provide more information than needed in a notification of this type. Discussion of the North Community example lead to the following dialogue:

Parent: *"Parents don't want to know all this stuff"*
Teacher 1: *"I don't want to know all that stuff."*
Parent: *"All they had to do is say 'we found asbestos and this is what we're doing about it.'"*
Teacher 2: *"There is obviously a problem and they are dealing with it, however, why they had to tell the parents all this nitty-gritty stuff is beyond me."*

When asked if they would call the school after receiving this notification only one parent said she would call. *"I'd call to say if there is that much asbestos and all this work has to be done, then why is the school open?"*

Specific concern was voiced about the sentence in the notification that reads, "If you discover any damaged ACM, immediately report it to a teacher, principal, or supervisor." This sentence was thought to indicate that the school did not have confidence in their original AHERA inspection, and was asking for the active assistance of parents and staff in performing inspections.

By contrast, one teacher in this group thought that the best sentence in the notification was "Our goal is to ensure the health and safety of all North Senior High School occupants."

Considerable discussion occurred on the topic of how much information parents need to know about asbestos.

> *"I trust them to do it* [behave responsibly about asbestos] *but I'd almost rather not know about it because if I know about it I'd want them to get it out."*
>
> *"The more* [information] *you give them the more parents start to knock down the door."*

By contrast one teacher thought that this letter was stronger than the others because it did provide so much information.

> *"I get the feeling that this letter is a little more honest than the rest ... The others say a Management Plan is available for review, but it doesn't say how you obtain it. You might have to pay $15 to get that one also. This one* [North Community notification says] *if you want to own it you have to pay $15, or you can review it. I just think they are being a lot more honest."*

In general, however, this group believed that the level of detail in this example, and particularly the list of areas with ACBM, was needlessly disturbing and unnecessarily detailed.

Comparison between Examples

Participants in this group preferred the South Community example over the other two. This was particularly surprising given their reaction to the West Township example, in which they had eager requests to learn the findings of the inspection. When asked about this apparent contradiction, the group expressed surprise over the extent of ACBM in the North Community example, and seemed to be saying 'if it is that bad you would be better not to tell us about it in detail.' One person did, however, state that if the first page of the North Community example had been more concisely and clearly written she might well have more patience and attention left for the presentation of materials on the second page.

Outline for Future Notifications

When the group was asked about what they would include in a notification, the following points were raised:

- The health risks of asbestos. (This opinion was expressed by several people, though others said *"no,* [that shouldn't be included] *that is scary"*);
- Explain the law and that it is being complied with;
- What will be done about the problem;
- When the problem will be treated;
- Occupants of specific rooms or areas that are affected should be notified of the ACBM present, and others need not be notified of this presence;
- The letter should be *"personal"*, rather than bureaucratic;
- One teacher said that he would like to see a very detailed letter, where *"the first page would be a very personal letter, without all the nuts and bolts, and legal stuff, from the principal, saying there are some concerns and we are taking care of them. The second two pages would be the technical"* report;
- Notifications should be written in the first person rather than the third person; and
- The letter should be sent home on vividly colored paper in order to show its importance and make it memorable.

When asked about the value of including specific elements in the letter, the group responded in the following ways:

- **Name of a designated person.** Eight people thought that the name of the AHERA designated person should be included in the notification. This was important because this is *"the person that if you have further concerns you call them."*
- **Designated person's telephone number.** Eight people also thought that the AHERA designated person's telephone number should be included in future letters.
- **Description of the law.** Four people thought that a brief or very brief description of the law should be included.
- **Name of the inspection company.** Five participants thought that the name of the inspecting company was important and should be included in notifications. Another said that the company's history including its insurance and bonding status was also important. Expressing a different perspective however, one teacher said, *"The statement that they are EPA-accredited is sufficient for me."*
- **Definition of key terms.** Nine people thought that key terms including friability and EPA should be defined for a parental audience.
- **Location of asbestos-containing building materials.** None of the participants thought that the notification letter should include the location and condition of ACBM.
- **Response actions planned.** Six people thought that a description of the response actions planned should be included. All of these people thought that a time frame for these response actions should also be included.
- **Health risks of asbestos.** Three people thought that a *"simple and brief"* description of the health risks of asbestos should be included in the notifications.

Additional concern was expressed in this group that the notification should be school based rather than district-based. This group also thought that the principal or someone at the school should be responsible for signing the letter, rather than someone at the district level.

Method of Distribution

All present recommended strongly that notifications should be mailed to parents directly, in a separate envelope. Alternatively, postcards with the notification information might be sent. *"You know when you get a letter in the mail it's important."*

Only as a much less desirable alternative, delivery by a child might be considered adequate. In the abstract, notification through a school newsletter was thought to be acceptable, particularly if no asbestos was found. The Appletree example, distributed to the group as an example of a newsletter notification, was generally considered to be inadequately informative if the school had found asbestos, however. Notification in a PTA meeting was considered inadequate and undesirable as *"only seven people would be informed"* and notification through a bulletin board was pronounced useless as *"no one reads them"*.

Special concern was raised about the ability of foreign parents to understand a notification. Moreover, in a local English for Speakers of Other Language (ESOL) program, 14 different languages were spoken. *"If it is not written simply enough for the child to translate for the parents, many parents will not be notified."*

In conclusion, the group was divided between those who felt confidence in their school districts and therefore did not feel the need for much detail or precision in their notifications, and the overwhelming majority of those who preferred the South Community example for its warm tone and moderate informational content.

NOTIFICATION FOCUS GROUP

New Orleans, Louisiana

Date: July 31, 1990

Attending: Five parents and five teachers, four of whom were also parents of school age children, attended the group. All of the participants were women. All but three of the participants were associated with public schools. One teacher who was also a parent was associated with a private school and two parents, one of whom was also a teacher, were associated with Catholic schools in the New Orleans, Louisiana area.

Previous Knowledge of Asbestos

The teachers in this group were much more knowledgeable than the parents about the asbestos status of their school. Four of the teachers were able to describe in some detail the types of response actions that had been taken to remediate their school's asbestos. By contrast only two of the parents were knowledgeable about asbestos in their schools.

Most of these knowledgeable persons had obtained their knowledge prior to AHERA, however, and only the same handful of parents and teachers in Catholic schools recalled being notified in a formal AHERA notification. None of the parents or teachers associated with public schools had been notified by their school under AHERA. As two public school teachers said,

> *"Public schools were not that open with parents or teachers. In fact I finally cornered the principal and said, 'What is that little box* [air monitoring device] *in our room?' ... No letters were ever sent out to parents, nothing was ever said."*
>
> *"They don't always tell the faculty, never mind the parents."*

The notifications that did occur were in Catholic schools. These notifications were by letter to both parents and teachers, though only parents and teachers in schools where asbestos was found were notified, according to one teacher in a Catholic school whose school did not have asbestos and who had not been notified. One parent of children in a Catholic school said about the notification sent out by the Diocese, *"I think a lot of parents were glad that they were aware what was going on"* as a result of notification.

One teacher said that she remembered something *"vaguely"* about a Management Plan being written for her school, but she did not know what it contained, or that it was supposed to be available to parents and teachers. The other participants had no knowledge about a Management Plan in their school.

Examples

Three examples of notification letters were distributed to the group for their reaction. Each letter presented a different degree of information about asbestos inspection, location of ACBM, and designated person information. Examples of these letters are in attachment B-1.

The West Township example was not favorably received by the participants. Discussion from the first focussed on what was missing from the notification.

> *"It says a Management Plan is available but it doesn't say that anything is necessarily going to be done, and it doesn't say 'Yes, they found something or they didn't, and if they did, what are they going to do?' You know nothing."*
>
> *"I would want to know more as a parent, and as a teacher I would want to know more."*
>
> *"They've taken the time to send us a note, tell us more."*

Reaction to the notification was in some cases even more negative with responses such as,

> *"This smacks of some kind of a cover-up."*
>
> *"They are hoping that 99% of people don't read it."*

One parent suggested that, *"In addition to this* [notification] *something should have been attached from the individual school."*

When asked if they would call for more information after receiving the West Township notification, all of the participants said that they would call. Many, however, said that they would call their school's principal rather than the AHERA designated person listed in the notification. The primary reason for calling the principal rather than the listed AHERA designated person was that the designated person was thought to be less accessible than a principal.

Reaction to the South Community example was more positive than to the West Township example, but still far from completely positive.

> *"I think this tells you more, but I still think I'd call the principal and say 'What is the condition in our school?'"*
>
> *"I thought the first letter didn't say enough, but this one; I think it says a little too much ... I was happy to see this one* [West Township example] *they were going to remove it,* [the asbestos] *but in this one* [South Community example] *they went into too much detail and the last paragraph would probably scare a lot of parents."*

Indeed, considerable concern was expressed in this group about the last paragraph of this example. This paragraph reads,

> "The overwhelming majority of asbestos-containing building materials in areas used by students and teachers were found to be nonfriable and in good condition. Any friable asbestos-containing building materials will be scheduled for repair, removal or maintenance as outlined in the Operations and Maintenance Program. Measures will be taken to prevent damage and disturbance of this material. Thus, as long as asbestos-containing materials remain in good condition and undisturbed, their presence does not pose a health threat to building occupants. We will closely monitor the condition of the asbestos-containing building materials until their ultimate removal."

Some participants singled out every sentence in this paragraph as *"the troublesome one."* Some thought too much was said about the planned response action, while several others said that the sentence that begins "Measures will be taken to prevent damage ..." needed more clarification. Others objected to the last two sentences. In these cases the idea of the asbestos-containing building material becoming damaged during the school year seemed to be so upsetting that the entire paragraph was rejected. *"That sounds like if you bump on the ceiling in one room you are disturbing it* [the asbestos-containing building material] *in another room."*

One teacher, however, said that she wanted to play the devil's advocate and stated,

> *"If you think about the actual logistics of a project of this nature the fact that they have ... gone to every school and monitored and they already determined which schools need to be helped ...* [The last few sentences show] *they are taking responsibility by admitting the problem exists and that they are monitoring it ..."*

By the end of her monologue on the topic, however, she had become noticeably more negative about the contents of the example letter and the value of the last two sentences in the final paragraph. She finished her statements by saying: *"I would not just accept the contents of this letter, I'd trot down and review that Management Plan."*

One teacher, however, had a quite different perspective, and thought that the South Community example was a fine example of a notification.

> *"It would satisfy me considering the size of Orleans Parish ... This would be more than they've said in a long time. Usually they give out vague information, two or three lines, and beat around the bush. This is straight to the point. I would be satisfied with this letter; I wouldn't even call."*

A topic that came up in this group which was not a major topic of discussion in any of the other groups was the difference in the type of notification that a parent should and would want to receive and the type that a teacher should and would want to receive. Several people thought that teachers should and would want to receive a more detailed notification than parents, while one teacher who was also a parent thought that parents should receive a more detailed notification. There was considerable discussion among the teachers who were also parents about what their reactions to the South Community example would be as a parent versus their reactions as a teacher.

> *"I think that most parents would accept this letter ... this would satisfy them,* [though it would not satisfy me as a teacher.]"
>
> *"As an ignorant, innocent parent this would be very acceptable. As a teacher who is right there, of course I have problems"* with this level of notification.

When asked if they would place a call to someone associated with the school about this letter, half of the participants said that they would call. This was divided between parents and teachers. When questioned about what they would ask about when they called, the participants said they would ask what rooms had asbestos-containing material and what the response plans were.

The North Community example was also not well received. Comments focused both on the poor writing style used in the notification and on the contents of the letter.

> *"This is a horrible letter and the $15* [charge for photocopying the Management Plan] *is the least of my concern."*
>
> *"If anybody takes a look at it* [the list of asbestos-containing materials] *they are going to panic."*

About half of the group expressed the opinion that this letter would be more appropriate for teachers than parents, though one parent strongly disagreed, indicating that parents should be as fully informed as teachers.

The primary points of concern with the North Community example were:

- The $15 charge for photocopying the Management Plan.
- The statement "If you discover any damaged ACM, immediately report it to a teacher, principal, or supervisor" was thought to indicate that the school had not performed a thorough inspection, and that as a result hazardous materials had gone undetected.
- The overly complete listing of asbestos-containing materials presented.

One teacher suggested that instead of listing all of the asbestos-containing materials in the school, a notification letter should only state the following:

> Step one should read: *"The majority of ACM is found in the attic, and boiler room, and a couple of classrooms were affected. Step two is what we are going to do ...* [Step three is] *if you have any questions call this number. Period."*

Other participants did not respond to this suggestion with any great degree of enthusiasm, but by this time in the group the tone had become so distrustful of school motives that no letter would have been widely accepted.

When asked if they would call the school after receiving this letter six parents, some of whom were also teachers, said they would call as parents, while no teachers said they would call as teachers. One activist parent who said she would not call explained this by saying, *"I wouldn't call because I would be there. I wouldn't take the time to call."*

One participant summed up her reaction to this letter by saying,

> *"If they are going to do this kind of foolishness, and send me out this kind of a long letter then they are also going to have to send me a schedule of repair"* and remediation.

In other words, "If the school is going to send out more information than I want, they are going to have to give me all of the information to make me not panic."

Comparison between Examples

While most participants' reaction to all three notifications was negative during the initial discussion, when asked to compare the three notifications, the group as a whole agreed that the South Community example struck the best balance between giving too much and too little information.

> *"The second one is more to the point and its not too wordy.* [The North Community example] *is too wordy."*
>
> The West Township example was *"an insult to my intelligence"* while the North Community example *"was absurd."*

Most particularly, almost all of the participants concluded that a listing of asbestos-containing materials was not a desirable element of a notification.

Discussion about the differing needs of parents and teachers came up again, with about the same number of people thinking parents should receive the South Community example and teachers should receive the North Community example, and those who thought that the South Community example was adequate for all notifications.

Outline for Future Notifications

When asked what items should be included in a notification, the following items were mentioned:

- Location of asbestos-containing materials;
- Plan of action to respond to the asbestos;
- Explanation as to whether children in certain classrooms are *"protected"* from asbestos risks; and
- Statement that further information will be sent out through out the year as the situation develops.

One teacher who is also a parent suggested that the EPA have a standard letter similar to the South Community example for use by all schools. The letter would contain points 1, 2 and 3 from the South Community notification: the definition of friability, a description of sampling methods, and an explanation of the development of a Management Plan. It would also contain new points 4, 5, and 6 which would be school specific. These points would include whether asbestos-containing building material was found in the school, that it presents no danger to users of the building, and that a specific type of response would be undertaken during a specific time frame.

When asked about the desirability of including specific elements in the letter, the group responded in the following ways:

- **Name of a designated person.** Eight participants thought that the name of the AHERA designated person should be included in the letter. Several people suggested that it would be helpful to have the names of two people listed, *"in case you can't get through to the first one. Two people should be knowledgeable enough to answer all your questions."* The participants who did not think this person's name should be listed explained that it was because *"I'm jaded, I just don't think you will ever get this person on the phone,"* and that thus there was no reason to include their name in the notification. This person also said that most people would probably go to the principal, who was *"somebody I knew,"* someone who was accessible, and who knew the physical layout of the school building.

- **Designated person's telephone number.** Eight of the participants thought that the telephone number of the AHERA designated person should be included in the notification.

- **Description of the law.** Nine participants thought that a very brief description of the law would be helpful. The one person who did not think that this would be useful said that *"all that friable and non friable stuff* [would not be read]. *I'm a science teacher and I didn't even want to read about friable and non-friable. Ordinary, everyday parents aren't interested."*

- **Name of the inspection company.** None of the participants thought that the name of the inspection company should be included in the notification. Two, however, said that a brief statement that the inspection company was accredited or approved by the EPA would be helpful.

- **Definition of key terms.** Only three participants thought that a definition of key terms such as friability should be included in the notification. Some of the people who said they did not think this should be included in a notification said that this definition *"made them nervous,"* and using this word runs the risk of letting less educated parents think that their children will be *"fried."* Others, however, said that a definition of key words increased parental confidence that the school was not *"hiding"* anything.

- **Location of asbestos-containing building materials.** None of the parents thought that a description of the locations of asbestos-containing building materials should be presented in the letter. When asked about the seeming inconsistency between the parents eagerness to know where asbestos was in the school, and their unwillingness to have it printed in the notification letter, the following comment arose: *"There is a difference between 'wanting to know where* [ACBM is in the school]*' and going and sending out a letter that's going to have 400 parents stampeding into the principal's office ... To me it's almost irresponsible to send out a letter that almost incites people to worry."*

- **Response actions planned.** All of the participants thought that a general description of the planned responses should be included in notifications. *"The parents have to be assured that their school is on top of the situation. So two or three concisely worded sentences that indicate that we are not just going to leave the Plan sitting on a shelf"* are necessary.

- **Health risks of asbestos.** None of the participants thought that the health risks of asbestos should be outlined in any detail in the notification. Two, however, thought that a very brief description should be included.

Method of Distribution

The best method of distribution for notifications was felt by most to be by mail. *"I don't think that this type of letter should be pinned onto kindergartners, this kind of letter should be signed, sealed and delivered to parents."*

There was general agreement that children, particularly middle school and above, don't deliver notices/papers to parents, and that notifications simply would not arrive unless they were mailed. Several parents' schools mailed out a monthly newsletter, and these parents thought that a copy of the notification letter should be stapled into the newsletter, as a foolproof and inexpensive route of delivery. These parents did not, however, think that including the notification in the Appletree example newsletter text was adequate.

Notifications posted on a school bulletin board would not be read, according to this group, and not enough parents attend PTA meetings to make this an adequate method of notification.

All of these non-mail methods of dissemination, with the possible exception of posting a notification on a bulletin board, were thought to be *"a nice followup, but should not be the only method"* of notification.

Attachment B-1

SAMPLE NOTIFICATION LETTERS

WEST TOWNSHIP PUBLIC SCHOOLS
West A Street
West Township, CA 91005

OFFICE OF THE SUPERINTENDENT

ob Smith
uperintendent
el. 818-555-1111

LETTER OF NOTIFICATION

TO: PARENTS AND STAFF
OF THE WEST TOWNSHIP SCHOOL DISTRICT

FROM: Bob Smith, Superintendent of Schools BS

DATE: June 30, 1989

Pursuant to the Asbestos Hazard Emergency Response Act (40 C.F.R. Part 763) all primary and secondary schools were required to be inspected for asbestos-containing building materials. Based on the results of the inspection, a management plan was prepared assessing each area and the condition of each.

This is to advise you that the West Township School District has complied with the legislation and has a management plan available for review in the central office of each school.

If there are any questions, they should be directed to the Asbestos Program Manager, Charles Brown, Facilities Supervisor at 555-1112.

SOUTH COMMUNITY UNIFIED SCHOOL DISTRICT
SOUTH B AVENUE, South Community, NJ 61105 • (011) 999-1111

Office of
Associate Superintendent
Management and Administrative Services
Jill Jones

October 14, 1989

Dear Parents and Staff:

In compliance with the U.S. Environmental Protection Agency regulation [40 CFR Part 763.93(e) (10)] "Asbestos-Containing Materials in Schools; Final Rule and Notice", the South Community Unified School District has completed the following requirements:

1. All facilities were inspected for both friable and non-friable asbestos-containing building materials. Friable is defined as easily crumbled or pulverized by hand.

2. Samples were taken during the inspections of all materials suspected of containing asbestos, an samples were analyzed at an EPA-accredited laboratory.

3. The District has developed Management Plans which include measures to prevent release asbestos fibers and to abate asbestos-containing building materials. These Management Plans also provide the locations and condition of the asbestos-containing materials. A copy of each school's Management Plan is located in the school office and is available for your review.

The overwhelming majority of asbestos-containing building materials in areas used by students and teachers were found to be nonfriable and in good condition. Any friable asbestos-containing buildi materials will be scheduled for repair, removal, or maintenance as outlined in the Operations a Maintenance Program. Measures will be taken to prevent damage and disturbance of this material. Thus, as long as asbestos-containing building materials remain in good condition and undisturbed, their prese does not pose a health threat to building occupants. We will closely monitor the condition of the asbest containing building materials until their ultimate removal.

Sincerely,

Jill Jones

Jill Jones
Asbestos Coordinator

NORTH COMMUNITY
SCHOOL DISTRICT

PARK AVENUE
NORTH COMMUNITY, GA 30050
PHONE: (555) 555-1212

Dr. Morris Sparrow.......*Superintendent*

April 26, 1989

Dear Parents and Staff:

The purpose of this notice is to inform you about steps being taken to eliminate the risk and to insure the safety of students and staff at North Senior High School with regard to asbestos containing material (ACM). The practices and procedures we are following were established by legislation known as the Asbestos Hazard Emergency Response Act (AHERA).

The first step in compliance with AHERA was an Asbestos Assessment and Inventory Study in all North Community School District buildings. This study found some ACM in North Senior High School.

The second step in AHERA is the development and implementation of an asbestos management plan. The "Plan" outlines all operations and maintenance activities used to control asbestos found in our buildings. Management Plans for the schools in North Community School District will be completed and submitted to the Department of Education for approval by May 1, 1989, and will be available for your review in each school's office.

You may obtain a personal copy of North Senior High School's asbestos management plan by submitting a written request or by "in person" contact with Richard Black, telephone number 222-4444. A reasonable "copy charge" of $15.00 must be paid with your request. Mr. Black is the person designated to carry out the North Community School District's responsibilities under E.P.A. Final Rule and Notice CFR Part 763, Section 763.84 and 763.92.

A fully certified environmental service company was engaged to (a) conduct the asbestos assessment and inventory study, (b) to develop the asbestos management plan, and (c) to train our maintenance employees in the removal and/or emergency repair of ACM commonly found in public buildings. These services have been completed and the school district is reviewing the asbestos management plan. This company will continue to conduct asbestos inspection activities in the school building at least once every six (6) months.

The following list summarizes the type and location of ACM in the North Senior High School building. Floor tile was assumed to contain asbestos. (Floor tile poses no health problem if the material is not ground, chipped, abraded, etc.) Friable ACM can be crumbled easily by hand pressure. Asbestos fibers are released into the air whenever friable ACM is disturbed. If you discover any damaged ACM, immediately report it to a teacher, principal or supervisor.

Avoid handling or disturbing the ACM at the following locations:

TYPE* - Fitting Insulation (TSIACM)
LOCATION - Guidance Area Conference Room

TYPE* - Ceiling Tile (SACM)
LOCATION - Maintenance Shop Storage Room

TYPE* - Pipe & Fitting Insulation (TSIACM)
LOCATION - Maintenance Shop Area

TYPE* - Boiler Breeching, Pipe & Fitting Insulation (TSIACM) - Friable
LOCATION - Small Boiler Room (1925 Annex)

TYPE* - Wall Plaster (SACM)
LOCATION - Stairway to Small Boiler Room

TYPE* - Floor Tile (MACM)
LOCATION - Room 108

TYPE* - Pipe Insulation (TSIACM) - Friable
LOCATION - 1925 Annex Attic

TYPE* - Shingle Roof (MACM)
LOCATION - 1925 Annex Attic

TYPE* - Transite Workbench Tops (MACM)
LOCATION - Industrial Technology Shop

TYPE* - Boiler, Pipe & Fitting Insulation (TSIACM) - friable
LOCATION - Large Boiler Room (1962 Addition)

TYPE* - Ceiling Plaster (SACM)
LOCATION - Room 128 (First Floor)

All of the friable materials presented above will be scheduled for repair, removal or ongoing maintenance. Our goal is to ensure the health and safety of all North Senior High School occupants.

Sincerely,

Morris Sparrow

Dr. Morris Sparrow
Superintendent

APPLETREE ELEMENTARY SCHOOL NEWS

September 13, 1990

Dr. Edgar Plummett, *Principal*

PRINCIPAL'S ADDRESS

To all parents and staff of Appletree Elementary School, greetings! As we begin the new school year, I want to welcome you back and hope you had a relaxing summer. For parents of new students and new staff, welcome!

At Appletree Elementary our goal is to provide a stimulating and enriching environment where each student's potential can be realized. We pride ourselves in bringing quality education to students for over 20 years, and we look forward to another rewarding school year ahead.

NEW COMPUTER FACILITY

This year we have many challenges ahead, as one goal for the new year is to introduce to students and staff our newly developed computer facility, thanks to the donation of four ZERON 249 computers from EEE Technologies. A special thanks goes to Mrs. Irene B. Maxwell for her initiative in contacting Mr. Cartell, President of EEE Technologies. Thanks, Irene!

SCHOOL LUNCH MENU FOR WEEK OF 9/17

Monday - grilled cheese sandwich, green beans, apple
Tuesday - fish sandwich, french fries, cole slaw, peanut butter cookie
Wednesday - tomato soup, frankfurter on roll, orange slices
Thursday - hamburger, peas and carrots, apple pie
Friday - chicken tenders, corn, brownie

ROOM MOTHERS WANTED!!!

We need volunteers to help out in the classrooms at least one day a week for the Kindergarten, 1st and 2nd grades. If you would like to volunteer, please call Ms. Schmeel at 555-1212 between 9:00 AM and 2:00 PM.

ASBESTOS REPORT

The AHERA (Asbestos Hazard Emergency Response Act) Inspection Report for Appletree Elementary School is available in the office of the principal. If you would like to see the report, please call the office to make an appointment. The report will be available throughout the school year.

SCHOOL CLOSING DATES

The school will be closed on Sept. 23 for staff development day. Please mark this down on your calendar.

APPENDIX C

MAINTENANCE AND CUSTODIAL WORKER

FOCUS GROUPS

DISCUSSION GUIDE AND FINDINGS

Part 1: Discussion Guide

Part 2: Findings

Appendix C presents the discussion guide and findings of the maintenance and custodial workers focus groups held for the AHERA evaluation. These groups were conducted with maintenance personnel (school staff responsible for small and moderately sized repairs to the schools' mechanical, plumbing and other systems) and custodians (school staff primarily responsible for janitorial and cleaning duties at schools). Focus groups were held in five locations nationwide.

Part I

A discussion guide presents a starting point for group discussions and is not a formal questionnaire. Unlike a questionnaire which must be administered in the same exact manner each time it is used, a discussion guide provides topics for the moderator to discuss using whatever phraseology he/she is comfortable with in the context of the ongoing discussion.

The following presents the discussion guide that was used during the maintenance and custodial worker focus groups.

July 1990

FOCUS GROUP GUIDE FOR MAINTENANCE AND CUSTODIAL WORKERS

Introduction

- *Introduce the concept of focus groups, the Asbestos Hazard Emergency Response Act (AHERA), and the AHERA evaluation.*
- First, I'd like to say that everything you say during this discussion will be held confidential. Following standard focus group procedures, this session is being taped to make it easier for me to write a report. Also, following standard focus group procedures there are observers behind the mirror. The mirror is there just so the observers don't interfere with our discussion.
- *Reassure participants that what is said in the discussion will be kept confidential, and that none of the examples given during the discussion pertain to the individual schools with which the participants are associated.*
- What is your first name and what kinds of jobs are you responsible for?
  (Remind them not to mention school name.)

Asbestos in Schools - Early

- When did you find out that there was asbestos in your school?
- How did you first find out that there is asbestos in your school?
- Did you know specific locations of the asbestos?
- Did you do anything different working around the asbestos back then?

Asbestos in Schools - Recent

- From this point in our discussion, I'd like you to talk only about your experiences in the last 24 months.

Q
- Have you been informed that there is asbestos in your school in the last 24 months or so?
  (Probe for written, oral, awareness training, mention of Management Plan, warning labels).

For notifications

What was in these notifications?
(Probe for locations of ACBM in school, mention of Management Plan.)

- Was there any reaction to these notifications?

■ Based on what was told to you in the last 24 months, do you know where the asbestos is in your school?
(Ask for a show of hands.)

Q - How did you find out where the asbestos is?
(Probe for written, oral, awareness training, mention of Management Plan, warning labels.)

■ If you're not sure where the asbestos is, do you know how to find out?
(Probe for Management Plan.)

Q ■ *Describe Management Plan.* Do you know if your school has a Management Plan?
(Ask for a show of hands for those who answer yes.)

- Do you know where the Management Plan is located?
(Probe for availability, access to updated version, also if workers are on night shift, can they get to it.)

- Have you ever looked up something in it?

- How easy was it for you to understand?

- Have you ever looked for something and not found it?

- Did you get any training or instruction on how to use the Management Plan? What kind?

- If you have a question about something in the Management Plan, who can you go to for help?

(Ask about second language, if applicable.)

Q ■ Does your school have an Operations and Maintenance plan, that is, written steps to follow in working around asbestos?

- Have you ever read it?

- Is it easy to use?

Training

- Within the last 24 months/those last 2 years, what types of training about asbestos have you received?
  (Probe for school sponsored or union sponsored.)

  - When did you first get training?

Q - How many hours did the training last?
  (Probe for 2-hour, 2-day training. Repeat by name, length of training for each.)

Q - What kinds of materials were used during this training?
  (Probe for written, video.)

  If video,

Q - Was someone with you during the video to answer any questions you had?
  (Ask for show of hands for those who saw video.)

Q - What kind of information was in the video?
  (Probe for health effects how to recognize asbestos, equipment used in asbestos work, and how to use a respirator.)

  - As part of this training, did someone explain to you where the asbestos in your school was?
  - Did someone walk through your school with you to show you where the asbestos was?
  - Did someone show you examples of asbestos?
  - Were you shown different kinds of equipment to be used around asbestos?
  - Did someone show you how to put on/use a respirator?
  - During training, did anyone show you how to do cleaning or repairs any different than the way you had been doing them?
  - Do you think the training covered all you need to know about working around or handling asbestos on the job?
  - What other information do you think would have been helpful during the training?

Asbestos Related Work

- *Explain that for this part of the discussion some questions may seem directed to maintenance, some to custodial. If a custodian does what the maintenance workers are asked, and vice versa, say so, but all may respond. Emphasize this is during the past 24 months.*

Ceiling area

Q ■ Have you ever been asked to clean up after a roof leak has damaged asbestos?
(Probe for how they know this was asbestos:

- *If asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If unknown, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If not asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *Or it hasn't happened.)*

Q ■ Have you been asked in the last 24 months to do work above a ceiling (tiles) where there is asbestos?
(Probe for how they know this was asbestos:

- *If asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If unknown, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If not asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *Or it hasn't happened.)*

Boiler Room

Q ▪ Have you ever been asked to clean up in a boiler room where there is asbestos?
(Probe for how they know this was asbestos:

- *If asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If unknown, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If not asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *Or it hasn't happened.)*

Pipe Insulation

Q ▪ Have you ever worked in a location where a pipe that is insulated with asbestos has leaked, damaging an area about this big *(show with hands)* and you were asked to repair the damage or clean the area? *(Show once area smaller than 3 feet, once area larger than 3 feet).*
(Probe for how they know this was asbestos:

- *If asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If unknown, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If not asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *Or it hasn't happened.)*

▪ What other kinds of jobs are you expected to perform around material that has asbestos?
(Probe for how they know this was asbestos:

- *If asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If unknown, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *If not asbestos, probe for procedures, special equipment, wet, HEPA vac, protective clothing, respirator; have any procedures changed in last 24 months?;*
- *Or it hasn't happened.)*

Q

- Have you removed asbestos in the past 24 months, or cleaned up after asbestos was removed?
    - Did you receive any special instructions before doing this removal?
    - Did you use special equipment to do this? *(Probe for protective clothing, respirator.)*
- *If respirators have been used by any participants, probe for which of 3 kinds of masks (dust, negative pressure, PAPR) were used.*
    - When were you given your respirator, and how did they test to see if it fit?
    - Are you the only person who uses a respirator, or do you share it with others?
    - Were you given a choice of which kind of respirator or mask to use?
    - Have you been given a medical exam through your job since you were issued a respirator?
- Have any other job duties, or the way you perform them, changed in the last 24 months or since your school was inspected under AHERA? *(Buffing pads)*
    - What kinds of jobs are you spending more time doing?
    - What kinds of jobs are you spending less time doing? *(Probe for AHERA jobs that take longer.)*
    - What techniques or procedures have changed in the past 24 months?
- Some schools have special staff that are called in to do some asbestos related work in the school or school district. Is this one way asbestos work is done at your school?
    - Under what circumstances are these asbestos specialists called in?
    - Can you ask to have these specialists come to your school?
    - Have you ever asked to have a specialist come to your school? *(Ask for show of hands.)*

Thanks and Conclusion

- Thank you for agreeing to participate in this group. As we said, any examples we have used do not relate to the schools where you work. Anything you have told us is confidential, and when we write a report, your names will not be used.
- Goodbye.

If participants express concern about health or safety, or have questions about procedures on the job, refer them to the person in charge of asbestos in their school.

Part II

The following section presents the findings of the focus group discussions held with maintenance and custodial workers in five locations nationwide. Each focus group posed questions to public school and private school maintenance and custodial staff. The primary topic of discussion was abestos awareness and asbestos-related activities during the past 24 months and the personal experiences of the participants. Opinions about the appropriateness of work practices and training expressed throughout this section reflect participant beliefs rather than EPA or Westat judgments.

MAINTENANCE AND CUSTODIAL WORKER FOCUS GROUP

St. Louis, Missouri

Date:	July 9, 1990
Attending:	Eight people consisting of two maintenance workers for private schools, three maintenance workers for public schools, one custodian for a private school, and two custodians for public schools in the St. Louis, Missouri area.

Job Responsibilities

The job responsibilities of the maintenance workers who participated in this focus group involved plumbing, heating, air conditioning maintenance and repair, floor tile removal, roofing repair and removal, and purchasing parts. The custodians were responsible for general cleanup and also assisted in emergency cleanup when a roof leak occurred or a pipe burst.

Initial Awareness of Asbestos

Three maintenance workers from public schools and one from a private school were first aware of asbestos in their schools approximately 10 years ago. At that time they had no awareness of any danger associated with the material and did not follow any special procedures while working around or repairing ACBM. The other participants were not aware of asbestos being in their schools until within the last two years.

Recent Awareness of Asbestos

All participants have become aware of, or have been made more aware of, the existence of asbestos in their schools within the past two years.

In no case was a notification sent or given to any of the participants. Most of the maintenance workers acquired a heightened awareness of asbestos when they were told to attend training sessions held in response to AHERA or, as one maintenance worker said, *"usually we pointed it out to them* [custodians]." The other maintenance workers became more aware of the ACBM when told that a private company had tested for ACBM. In one case, a maintenance worker saw paperwork about an asbestos inspection on his supervisor's desk and asked about it.

The maintenance workers know where the asbestos is located, based in large part on what they were told by a supervisor or by other knowledgeable individuals (such as inspectors or outside consultants). The custodians had been made aware of asbestos through training, but could only speculate about the exact locations of ACBM. In some cases, knowledge about the location of ACBM was based on what other (not particularly well informed) school workers had said.

The subject of the Management Plan came up during the discussion. All maintenance workers were aware of the Management Plan and had access to it. One had his own copy. Only one custodian had some awareness of the Management Plan. About half of the maintenance workers had read the Plan. They found it difficult to read and understand, but said it could be done, *"You've got to be a lawyer or engineer. I don't think it'd be easy for anyone. You'd almost have to be a professor."* Two people had used the Plan to determine whether or not a material contained asbestos. Two maintenance workers stated that they used building blueprints to determine whether the specifications called for ACBM, and that was their basis for determining whether or not a material contained asbestos.

If they needed help in understanding the Plan, about half the maintenance staff would go to their supervisor and, if no assistance was available, would contact the company that wrote the Plan. The others felt that it would be necessary to go to the company initially, since they were the only ones who could really be trusted.

There was no awareness of an Operations and Maintenance (O&M) Plan specific to any individual school. Most maintenance workers were aware of having general procedures given to them during training. *"We have no set procedures"* for cleanup. One custodian thought there was an O&M Plan, but he had not seen it.

Training

All participants, with the exception of one private school maintenance worker, had received asbestos training. Half the participants received training before the school was inspected for asbestos, half after. The maintenance workers attended two or three-day classes which included movies and film strips on asbestos awareness and health effects, examples of ACBM, and hands-on training in glove bag removal procedures. Additionally, these workers received another training session on cleaning and removal procedures.

The custodians all remembered a movie, with someone available to answer questions. This awareness training was either a two- or four-hour course. There was scant recollection as to the content of the training, other than it had a lot of big words and that asbestos was in hair dryers and other common appliances.

Part of the training for three maintenance workers included information on negative pressure respirator use. The only fit testing that occurred involved positive and negative pressure testing (holding your hands over the canisters to create a vacuum).

The maintenance workers felt their general asbestos training was quite comprehensive. One person said, *"I know enough not to handle it."* The custodians, however, clearly did not feel they knew enough about asbestos and expressed a concern that no one really cared about them and their exposure to ACBM.

Asbestos-Related Work

A series of questions about work experiences around asbestos were posed to all participants. The first question dealt with cleaning up after a roof leak had damaged asbestos. The custodians had cleaned up after roof leaks but were not sure that asbestos was involved. No special cleaning procedures were followed. One maintenance worker said he had cleaned up a roof leak following glove bag procedures. Based on the description provided by this maintenance worker, these procedures must have been modified as glove bags are usually intended for use on pipes.

The second question involved working above ceiling tiles where asbestos was located. Most custodians had worked above ceiling tiles or with tiles that contained asbestos. No special procedures were followed. Most situations were viewed as maintenance emergencies and there was no time to follow special procedures. In one case, since the ceiling tile was "*not friable*," no need was seen to follow any special procedures.

Question Three dealt with cleaning in a boiler room where asbestos was located. Two maintenance workers, both from public schools, followed special procedures (suits, respirators, and disposal) to clean up problem areas in the boiler room. No one else in the group had been involved in this type of cleaning.

The fourth question dealt with working in a location where a pipe insulated with asbestos had leaked, damaging less than three linear feet of insulation. One situation experienced and described by two public school maintenance workers (who work in different schools) was that an asbestos crew happened to be in the school and was asked to remove the damaged asbestos and they did so, following reportedly appropriate procedures. However, in the process, other ACBM was damaged and was left without being cleaned up. Maintenance staff at the public schools followed special procedures for handling ACBM when dealing with water damaged asbestos both less than and greater than three linear feet. One private school maintenance worker has repaired insulation in a similar circumstance, not following any special procedures. There have been no circumstances where the participants have cleaned up around ACBM with greater than three linear feet of damage.

If problems occur during the middle of the night, the public school staff simply do the job, without using special procedures or equipment.

> "*They call you in, you don't know what you're getting into,* [or] *how to prepare for it, ...* "
>
> "*It's time when you have an emergency and don't give it a second thought.*"
>
> "*It's like this, one guy is trying to do the job of ten guys.*"

Other types of work around ACBM included removing floor tiles, roof tiles, and, for custodians, sweeping in areas where they did not know for sure ACBM was present, though they thought it possible. Four maintenance workers have removed floor tile with no special procedures except to use a heat gun. Rags have been used to wipe up after removal and are then re-used. In one instance, when a large area of tile was being removed, the custodian who was assisting in the removal called OSHA for guidance. OSHA, however, claimed no authority. The school hired an outside contractor who used masks, or perhaps respirators, but did not seal off the area.

Respirator Availability

Training on use and fit (positive and negative pressure testing) was given during the required AHERA courses to all maintenance workers, except for the one private school worker who has not had any training. Three of the five maintenance workers have negative pressure respirators. The two public school workers obtained school funds and purchased the respirators and canisters themselves. The private school worker has one available through his school. All of these respirators are available for anyone to use. One private school worker was told by his school to obtain a medical exam as a result of training, and this person does not have a respirator.

No custodians have access to a respirator.

Other

There has been no change in job responsibility during the past two years. The only change in equipment or techniques of ACBM management include using glove bags around asbestos, and that only in the public schools.

All but one school represented use outside contractors to perform large asbestos jobs. The one who does not has only a small amount of ACBM in the school.

Conclusions

All workers, both maintenance and custodial, have been made aware of asbestos and the maintenance workers appear, with one exception, to have received the required level of AHERA training for their job responsibilities. However, the custodial staff have received only a basic awareness training. By their own reporting, they do disturb ACBM and therefore their level of training does not meet AHERA requirements. The maintenance staff are aware of where asbestos is, though custodial staff are less sure and less knowledgeable about how to find out whether a material is ACBM. Again, maintenance staff are aware of a Management Plan and have access to it. This is not the case with custodians. Asbestos-related work is performed according to appropriate procedures more in the public than private schools, except in the case of maintenance emergency repair, when appropriate procedures are frequently ignored even in public schools.

There is genuine concern on the part of support staff for their own health, though some feel it is *fait accompli* that they have had significant exposure to asbestos, and probably are continuing to be exposed. *"It's my job. What are you going to do?"* There is also concern for the students in the schools. Public school staff especially expressed confusion and anger over why the asbestos that is present is not being removed more quickly and in a more ethical manner.

MAINTENANCE AND CUSTODIAL WORKER FOCUS GROUP

Boston, Massachusetts

Date: July 12, 1990

Participants: Three people consisting of two maintenance workers for private schools and one maintenance/custodial worker for a private school in the Boston, Massachusetts area.

Job Responsibilities

The job responsibilities of the maintenance workers who participated in this focus group involved carpentry, painting, sheetrock installation, electrical work, and water treatment plant operations. The person who was responsible for both maintenance and custodial work performed these tasks as well as traditional custodial duties.

Initial Awareness of Asbestos

Two individuals became aware that asbestos was in their schools about ten years ago, one through hearsay and the other because asbestos was required by state law to be part of fire doors. The other was made aware of asbestos when he was hired two years ago.

Recent Awareness of Asbestos

Approximately two years ago, two workers were told by their supervisor that there was asbestos in the schools. The other worker first saw a notice about required asbestos training posted and deduced ACBM was present. In all cases a notice had been posted about a required training film and speaker or about an upcoming asbestos inspection.

The maintenance workers know where the asbestos is located either because they were told by a supervisor or because materials are marked as being ACBM. In one case, the wrapping on asbestos pipes is different from that on non-asbestos pipes, making it clear what is ACBM. If anyone is unsure of whether a material was ACBM, they stated they could go to their supervisor or to the Management Plan.

All participants were aware of the Management Plan, though only one worker had gone through the Plan. He felt that, *"It took a while,* [but it's] *not bad, when you get on to it, you can find out."*

The Management Plan was available for all maintenance workers, and the individual who had gone through the Plan stated that an Operations and Maintenance Plan was included in his school's Plan. *"That book is there for anybody in the maintenance department who needs it."*

Training

These maintenance workers were all told that they were not expected to deal with any materials that contained asbestos. All workers were trained during a two or four-hour training session. These sessions included films, slides, and someone to interpret the presentation and answer questions. The films and slides covered the history of asbestos, health issues, and where it is most likely to be found. Two workers were shown suspect and actual locations of ACBM in their schools, and two trainings included a segment on procedures, one of which showed examples of asbestos. *"After you see this* [the film] ... *I don't want to* [work around] *it."*

There was, however, consensus that the training received was sufficient for the participants' job responsibilities.

At one school, a maintenance worker related that some newly-hired housekeeper/custodial workers had been given the same training that he had and, since they had difficulty with English, an interpreter assisted in explaining the information.

Asbestos-Related Work

None of the maintenance workers were expected to do any work with asbestos or in locations where they might come into contact with ACBM. The one exception was that one person said that his arm might brush against pipe wrap, but he was not responsible for working directly with it. The only activity mentioned was that one individual had painted ACBM pipe insulation with latex paint which helped seal it, but that the insulation was in excellent condition, and that painting was being done in the area anyway.

None were responsible for removal of any ACBM. In all cases, if there was a question about anything, the workers felt they could go to their supervisors for assistance and information. For these reasons the questions in the discussion guide about specific ACBM related tasks were not discussed in great detail.

Respirator Use

No one had been issued a respirator nor did they feel they needed one, given their job responsibilities.

Other

There had been no change in jobs during the past two years.

Two of the three schools' ACBM was labeled as such.

All schools represented use outside contractors to perform any jobs which might disturb ACBM.

Conclusions

The private school maintenance workers represented by this focus group had been made aware of asbestos in their schools and appear to have received the required training. Even though they are maintenance workers, their actual job responsibilities do not involve potentially disturbing ACBM and therefore, the short course is sufficient according to AHERA. If any have questions about ACBM and its locations in the school, they have access to the Management Plan, and are comfortable with bringing questions to their supervisors.

These maintenance workers believe that they were adequately trained and are comfortable with their school's handling of any asbestos. As one person said, *"It did enough,* [and] *made me aware of it,* [to] *be careful enough to keep away from it."*

MAINTENANCE AND CUSTODIAL WORKER FOCUS GROUP

Seattle, Washington

Date: July 23, 1990

Attending: Nine people consisting of one maintenance worker for a private school, five custodian-engineers for public schools, two custodians for private schools, and one custodian for a public school in the Seattle, Washington area.

Job Responsibilities

The job responsibilities of the custodian-engineers, custodians with significant though not major maintenance responsibilities, included general cleaning, repair, refrigeration, and heating and ventilation work. Custodians were responsible for general cleanup and assisted in emergency cleanup when needed, for instance, when a roof leaks or a pipe bursts.

Initial Awareness of Asbestos

All participants, with the exception of a private school custodian, were aware of asbestos in their school at least eight to ten years ago, and some were aware up to 15 years ago. In some cases this was based on bulletins posted for general information, and for others it was based on general knowledge of asbestos learned through working with the material. One respondent stated that *"I knew it was there,* [but] *I didn't know anything about it."* The private school custodian became aware of ACBM through material labeling when he was first employed at the school.

Recent Awareness of Asbestos

All participants have become more aware of the existence of ACBM in their schools within the last few years.

None of the participants remembered a specific notification of the existence of ACBM within the past 24 months. The participants were, for the most part, made aware of the presence of ACBM in their schools through the requirement that they attend an asbestos training course. Two private school custodians were made aware of ACBM when inspectors came to perform the AHERA inspection.

All participants believed that they knew the location of asbestos in their schools, based on labeling in the schools, meeting with a supervisor, pre-AHERA awareness training, or in one case having been asked to report on the condition of ACBM through review of a pre-AHERA inspection.

A large majority of the participants knew about the existence of a Management Plan and had easy access to it. Three custodian-engineers had used their Management Plans. *"I had no problem using it. It's a pretty good book."* One custodian-engineer said that when he went to his current school, approximately two and a half years ago, he would not do any work until he checked out the Management Plan.

One private school custodian had no awareness at all of a Management Plan, and one public school custodian said he thought he had heard of it. The public school custodian-engineers stated that they had the telephone number of the designated person and would go to that person if there was a problem interpreting the Plan. Other participants said they would go to a supervisor for information.

No one was aware of a written Operations and Maintenance Plan. Several individuals stated that they had been given verbal instructions in techniques for working around ACBM.

Training

Seven of the participants received training consisting of one and one-half to two hours of video tapes and some oral presentation within the past 24 months. One private school custodian had taken a one-week asbestos worker course and received his certification. One private school custodian had received no training at all.

Information presented during training for the majority included the history of asbestos, why it is used, and only a few comments regarding health effects. These individuals had received pre-AHERA training which they felt was more comprehensive and useful. One person said, *"In my opinion it was way outdated. It could've been something a little more recent."* In one case someone pointed out where ACBM was located in a specific school. In another case, *"They gave us this book* [Management Plan] *and said, well, look it up."*

No different procedures for working around ACBM were presented during the training, with the exception of training received by the one-week course participant.

Suggestions for additional information to include in training were samples of asbestos and more information on health concerns. However, one participant stated that *"I think they actually tried to downplay this – so people couldn't go off on a tangent."* Others expressed an interest in knowing what kind of exposure would be expected from different types of ACBM, such as floor tile and spray-on insulation.

There was, for the majority, a clear feeling that the training was not enough, and that in particular more emphasis should be placed on safety procedures for the workers.

Asbestos-Related Work

A series of questions about work experiences around asbestos were posed to all participants. The first question dealt with cleaning up after a roof leak had damaged asbestos. All had cleaned up a roof leak situation but none knew if ACBM was present or damaged and no special procedures were used.

The second question involved working above ceiling tiles where asbestos was located. Several participants have worked above tiles but did not know if ACBM is present. If there is a knowledge that ACBM is present everyone said they would not do work in that area. Other workers are called in if ACBM is known to be present. One private school maintenance worker does work above ceiling tiles and is not sure if there is ACBM, but he *"stays away from the pipes."* No special procedures were followed in any of these cases. It was clear, however, that pre-AHERA most public school custodian-engineers would have performed such duties.

Question Three dealt with cleaning in a boiler room where asbestos was located. Two participants perform cleaning in this situation. Both wet mop the area, as they have always done, and no special procedures are followed.

The fourth question dealt with working in a location where a pipe insulated with asbestos had leaked, damaging less than three linear feet of insulation. No one performs any work in this kind of situation; someone else is called in. In one private school this situation occurred recently and is awaiting action. There have been no situations in the participants' schools in which greater than three linear feet of ACBM was damaged.

Other jobs around ACBM include working with floor tiles. Procedures for waxing and buffing have not changed post-AHERA. Uncertainty as to the appropriateness of these procedures is prevalent: *"I can't get an answer, they feel this won't hurt us. I have kids walking in the hall, with sand ... we only sweep the floor every two days. Does that sand hurt?"* In several cases, when vinyl asbestos floor tile (VAT) *"busts loose,"* the tiles are simply picked up and tossed into the trash. One private school custodian said that their VAT *"tile has very little* [asbestos], *so we're fortunate and don't have to worry."*

Other situations include custodians dry sweeping floors next to pipes insulated with ACBM, and a maintenance worker drilling into plaster wall with no knowledge of whether or not the material has asbestos in it. One public school custodian changes filters in the boiler room where piping is insulated with ACBM. No special procedures are followed in any of these cases.

None of the participants have been involved in removing asbestos or cleaning up after asbestos was removed.

Respirator Availability

About half the participants were trained, pre-AHERA, in respirator use. This training ranged from being shown a respirator to actual suiting up. None were fit-tested. Respirators (with purple filters) are available for half the public school employees. They are for anyone who wants to use one, but these participants have not done so. These respirators are included in *"asbestos kits"* which include suits, respirators, yellow warning ribbon, and a wetting bottle. However, said one participant *"have you ever tried to get supplies for those? To get them resupplied isn't that easy in the past few years."* The other participants do not have access to respirators.

No one has been advised to obtain medical exams in support of respirator use.

Other

The only change in job responsibilities involves the public school custodian engineers who now perform the AHERA required six-month inspections. In addition, most have been told not to work around asbestos and to keep an eye out for it.

About half the participants have specially trained people in their school districts to handle asbestos problems. The others use outside consultants. All use outside consultants to deal with major problems or school renovation.

Labeling of ACBM is very limited in the schools represented.

Conclusions

All workers appear to be aware of asbestos in their schools. Training appears to be adequate only to the extent that most people had received significant training pre-AHERA. The participants have been told not to work around ACBM. The exception to this is the private school custodian who has had no training and does work around ACBM. Most are knowledgeable about the location of ACBM, although further training on identifying ACBM would be helpful, as would having specific locations pointed out. Management Plan awareness is high, though additional use of the Plans would heighten knowledge of ACBM locations. Much custodial work is done without regard to appropriate work practices, simply because the workers have not been told differently.

There is concern about health effects, though several people feel that they are following appropriate procedures and that, since they have been told not to work around ACBM, this is not a significant issue. Concern about this is divided equally between custodian-engineers and custodians. In addition, several people are aware of situations in their schools that they believe are dangerous, such as fan areas where friable ACBM is located or buildings belonging to their district but used by other groups, such as a pre-kindergarden, which are cleaned (as far as they know) without any awareness of ACBM location or condition.

MAINTENANCE AND CUSTODIAL WORKER FOCUS GROUP

New Orleans, Louisiana

Date: July 31, 1990

Attending: Five people consisting of three custodians for public schools and two maintenance workers for private schools in the New Orleans, Louisiana area.

Job Responsibilities

The job responsibilities of the custodians consisted almost exclusively of keeping the buildings clean and very minor maintenance work. The maintenance workers were responsible for building equipment maintenance including heating, air conditioning/refrig-eration, and plumbing.

Initial Awareness of Asbestos

One custodian became aware of asbestos in the school during an inspection about six years ago. Most materials were removed and what remained was labelled. There was no change in job procedures. All other participants became aware of asbestos in their schools within the last two years.

Recent Awareness of Asbestos

All participants were aware of asbestos in their schools.

A majority of the participants had been informed about asbestos, however, none remembered a specific written notification about asbestos in their schools. One public school custodian remembered a bulletin requiring all workers to attend a workshop about asbestos. One private school maintenance worker attended a required workshop about asbestos, and he also remembered a notice sent to parents about two years ago. The other maintenance worker was notified verbally by his supervisor. Two custodians had no recollection of any notification; their knowledge of ACBM came from what other school workers had told them. One custodian said, *"During testing, guys came around, of course they never tell you whether they found it or not, but it's an old building."*

All maintenance and custodial workers believed they knew the location of asbestos in their schools, based on what was in the Management Plan, what was labeled, or what they had been told by a supervisor. The one exception to this was a public school custodian who said, *"It would be to use my own judgment, to say if somebody came and told us, not me."*

Only one public school custodian was aware of a Management Plan. She never had used it, but expressed clearly that she could use it if she so desired and had easy access to it, saying *"It was given to us to look at, and after we reviewed it, we gave it to the principal."*

No one was aware of a printed Operations and Maintenance Plan. They felt that there was a verbal process of information dissemination. The technique described to these participants involved sweeping ACBM up, putting it in a bag, and throwing it away. One maintenance worker had been told not to drill into any ACBM.

Training

Two participants received training, one custodian and one maintenance worker. The maintenance worker attended a two to three-hour workshop that covered removal and handling asbestos, and he suited up with a respirator. The custodian attended a one-hour mandatory session where films were shown that discussed equipment and what asbestos looked like. The designated person was present for the viewing of the film. In her opinion, *"It was a big help."* In neither case was the location of ACBM pointed out during training, nor was it presented at a later time. The other three workers received no training. The maintenance worker was simply told, *"Just don't deal with it."*

No specific procedures for working around ACBM were presented during the training.

Participants suggested adding more information about health effects of asbestos during the training. Those who did receive training felt it was not adequate, but that they pay more attention to it now.

None of the participants were aware of training required for or presented to new employees.

Asbestos-Related Work

A series of questions about work experiences around asbestos were posed to all participants. The first question dealt with cleaning up after a roof leak had damaged asbestos. Two custodial workers cleaned up after leaks. One said she had never been told if there was asbestos present. The other custodial worker mopped up the leak before anyone else came because children were present. Co-workers had told her there was asbestos present. No special procedures were followed in either case.

The second question involved working above ceiling tiles where asbestos was located. One maintenance worker stated that he worked near ACBM, but since he had been told not to drill into the material, he did not. He did however, work above ceiling tiles in close proximity to the material.

Question Three dealt with cleaning in a boiler room where asbestos was located. All custodial workers had at various times cleaned up in boiler rooms. In one case ACBM is labelled and the custodian stayed away from the material. Another custodial worker had swept up a powdery dust in the school boiler room but did not know if it was asbestos. No special procedures were followed.

The fourth question dealt with working in a location where a pipe insulated with asbestos had leaked, damaging less than three linear feet of insulation. One custodian cleaned a pipe leak in a boiler room without following any special procedures. Later, when a plumber came to repair the pipe, he would not touch it since the insulation contained asbestos. In one other case, a maintenance worker picked up a piece of insulation that had fallen to the floor and threw it away. He stated that he was just doing his job. There have been no situations where greater than three linear feet of ACBM had been damaged.

Other jobs around ACBM include cleaning (wet mopping) vinyl asbestos floor tiles (VAT), dry buffing VAT, and picking up pieces of VAT when it is broken and throwing it away. One maintenance worker removed an asbestos insulation plug in order to drain the boiler.

In no cases are any special procedures followed when working around asbestos.

None of the participants have been involved in removal of ACBM or cleaning up after asbestos was removed.

Respirator Availability

Only one worker had received some training in respirator use, and none have access to respirators.

Other

There have been no changes in job responsibilities in the past two years except that one maintenance worker has been told not to disturb any ACBM.

Most schools have outside consultants to deal with any asbestos. One private school maintenance worker said that the school *"deals with it."* One public school custodial worker said that the school board has people on staff to deal with asbestos problems. In all cases, if any problem was suspected, the participants said they would either go to their supervisor or their principal.

Only one school had asbestos labeled.

Conclusions

There is a lack of knowledge about asbestos and awareness of the location of asbestos in the schools. Over half the participants did not receive training, their only knowledge of asbestos being based on what they were told by co-workers. This is definitely not in compliance with AHERA requirements. Only one person was aware of a Management Plan. With one exception, work is done without regard to appropriate procedures. This is due to the workers not being informed as to what appropriate procedures are and because of lack of enforcement by supervisors.

There is a high level of concern about personal safety. Some participants said they want suits and masks. They felt that everyone should be told about asbestos and that everyone should have to attend a training program. One custodian stated that a training program, *"Lets you know more how to take care of yourself. To not know where it is, to not be told, then you're in danger all the time."*

MAINTENANCE AND CUSTODIAL WORKER FOCUS GROUP

Bethesda, Maryland

Date: October 10, 1990

Attending: Five people consisting of three maintenance workers for public schools and two maintenance workers for private schools in the Washington, D.C. area.

Job Responsibilities

The job responsibilities of the maintenance workers who participated in this focus group involved plant equipment operations, heating and air conditioning maintenance, building and grounds maintenance, replacement of ceiling tiles, and plastering. Several participants performed all maintenance except that for which a license was required.

Initial Awareness of Asbestos

Several participants were aware of the existence of asbestos in their schools from 15 to 20 years ago. One simply just *"knew it was there"*, while others were made aware through a seminar or through special work practices, such as applying a *"special paint"* to seal asbestos pipe insulation. One participant was made aware of asbestos when he was transferred to a different school about eight years ago, and another was made aware of asbestos about three years ago when an inspection was being conducted in the school.

Recent Awareness of Asbestos

All participants had been informed of the existence of asbestos in their schools within the last two years.

Three workers received notices about asbestos in their schools, and in a few cases the Management Plan was mentioned. The public school workers who were building-based received notices circulated to them individually, as did a private school worker. The other workers were made more aware of asbestos through warning labels and training seminars.

Everyone believed they knew where the asbestos in their school was located, based on information in the Management Plan or the location of labels. Additionally, the participants believed they knew the location of asbestos relative to their job responsibilities, though not necessarily the location of all asbestos in their individual schools. If there was any question, most workers felt they could ask a supervisor or go directly to the Management Plan. Only one private school worker felt he had no one to go to for information, as the designated person was new and the information was *"too recent."*

The Management Plan was mentioned early in the discussion. All participants had seen Management Plans, and several had looked up the location of asbestos. The consensus was that finding information was not all that easy, and once the information was found, it was not very clear. All workers stated that they could contact a supervisor for help in understanding the Management Plan, though one participant thought that his designated person was too new to be truly helpful.

No one was familiar with the existence of an O&M plan as part of the Management Plan. The workers felt they had received this information during training. One worker stated that there were *"...only two things to be concerned with, that it [ACBM] is covered and safe, or that if it [ACBM] is broken, it has to be removed."*

Training

All participants had received asbestos training within the past 24 months. All but one worker had received a two-hour training session. One worker attended a three-day session. These two-hour sessions included films and slides, with someone leading the session to answer questions. The class content was primarily awareness training, what asbestos looked like and the likely places to find it. Some were shown on film the containment process, including glove bag procedures. All were told very emphatically not to touch or disturb ACBM. The one worker who attended the three-day session felt his course was very informative and included a hands-on removal training session.

Only one worker, a private school employee, was told specifically the location of ACBM in the school during training. The others received general information about where asbestos-containing material was likely to be found.

Most workers saw only films which explained equipment used in asbestos removal. One worker, the three-day graduate, has hands-on experience with safety equipment.

One statement which sums up feelings was that *"You don't have time to fix one joint that takes four hours to do."*

The participants thought that several areas should have been explained in greater depth during training. They wanted to know more detail about how to remove ACBM on the spot, and they wanted more information on the statistics and health hazards as well as more information on how to work safely around ACBM.

Asbestos-Related Work

A series of questions about work experiences around asbestos were posed to all participants. The first question dealt with cleaning up after a roof leak had damaged asbestos. A few workers had performed clean-up jobs in this situation, one of them frequently. Procedures included making a supervisor aware that the area was labeled ACBM and checking the Management Plan to confirm the presence of ACBM. In one case a worker was told to clean up anyway, and he did so without following appropriate work practices. Another was *"...careful not to disturb it* [ACBM]*"*, but he, too, did not following any special work procedures.

The second questions involved working above ceiling tiles where asbestos was located. Most workers had performed this kind of work and no special work procedures were followed. The concensus was that there was no time to do *"...everything right."* Concern was also expressed that the labels that state ACBM is present do not clearly show which materials contain asbestos.

Question Three dealt with cleaning in a boiler room where asbestos was located. Most workers have performed cleaning jobs in this situation. Procedures involved sweeping, mopping, dusting, and using a water hose to wet down the floor. The feeling was that all the ACBM is covered and none of it is lose or friable and, therefore there is no danger. As one person said, *"They ain't proved to me it's dangerous."*

The fourth question dealt with working in a location where a pipe insulated with asbestos had leaked, damaging less than three linear feet of insulation. In one situation that occurred, the worker cleaned up with a dust pan and broom and put the material in the trash. Another worker had patched ceilings around damaged ACBM but was careful not to disturb it. No special work procedures were followed. There were no cases where an area greater than three linear feet had been damaged, except that one worker had to clean up debris after a contractor had removed a large amount of ACBM. The only special procedure followed was hosing down the floor area.

Other types of work around ACBM include working on boilers and the heating plant systems, patching plaster around ACBM, and floor tile removal. In one case an outside contractor removed ceiling tiles with ACBM and in the process damaged floor tiles. The worker asked the contractors about it and one of them picked up a tile and threw it across the room indicating that the tile was harmless. The worker proceeded to clean up the floor tile. This all occurred in a containment area.

The following quotes typify feelings expressed in the discussion.

> *"It's not a realistic thing. This is a small school ... We still had to go through. They told us not to go inside the boiler room. We still went in there. We didn't have lights."*
>
> *"I have to do my job, if I don't do my job, ... the whole building might blow up."*

Respirator Availability

Several workers have access to respirators, although only one private school worker had received training. He does not use a respirator since he was told to stay away from ACBM. A few public school workers have access to respirators. One believes that the respirator he used was the wrong kind since he does not feel well when he uses it. In another case a worker has his own respirator which he has used in a boiler room. These respirators are for use only by the individual workers. Only the private school worker who attended the three-day course had been to see a doctor about respirator use, and the exam was reportedly perfunctory.

Other

The only job responsibilities which appear to have changed within the past two years are those having to do with work above ceiling tiles where there is ACBM.

All participants reported that their schools use outside contractors to perform large asbestos removal jobs, although one person said he had heard that at some time in the future there was to be a special school district abatement team to handle these matters. All would go to a supervisor first if they suspected a problem which needed an outside contractor. In one case, a worker had requested a removal crew but was turned down by his supervisors. Several people felt that the contractors do more damage than good and that excessive costs were interfering with removal occurring more rapidly.

Labeling was reportedly extensive in the schools in this area.

Conclusions

All workers have been made aware of asbestos in their schools. However, most do not appear to have received the AHERA-mandated level of training considering their job responsibilities and that they very possibly disturb ACBM. The maintenance workers know where the asbestos is located and have good access to additional information, both from people and Management Plans, if they so desire. Appropriate work procedures do not appear to be followed in most cases around ACBM, either because the job has to be done immediately in a maintenance emergency situation, because inadequate training and no access to appropriate equipment get in the way, or supervisors tell the workers to do the work anyway.

Concern over job security was expressed quite strongly by one maintenance worker. He had objected to doing a job and was told by the school safety division to go ahead. As he said, *"I got chewed out for doing it, but if I wouldn't have done it, my superiors probably would've held me insubordinate ..."* There was concern expressed that they as workers have been told that asbestos is dangerous, but that it is not clear to the public what is considered safe and unsafe with regards to asbestos. There was concern expressed for their own safety while on the job, their wanting further information on safe work practices and health issues. There was also some confusion in that some workers believed the only safe thing to do was to remove all ACBM from the school.

APPENDIX D

MANAGEMENT PLAN

COMPLETENESS ITEM RESULTS

391

Percent of Management Plans awarded specified points in Form M1[1]

Question	Points[2]												
	0	.2	.5	.8	1	2	3	4	5	8	10	14	NA[3]
General Inventory													
1c. Is a general inventory of school buildings present?	2%	x	x	x	x	x	x	x	98%	x	x	x	x
2c. Is the name and address indicated for each school building on the inventory?	2%	x	3%	x	3%	90%	x	x	x	x	x	x	2%
3c. Is it indicated whether each school building listed contains friable ACBM, nonfriable ACBM, nonfriable ACBM, ACBM assumed to be ACM or no ACBM?	11%	x	x	x	2%	9%	76%	x	x	x	x	x	2%
Exclusion/Inspection													
5c. Does the management plan contain exclusion/inspection information?	0%	x	x	x	x	x	x	x	100%	x	x	x	x
6c. Does the exclusion/inspection information contain:													
a. Dates of inspection?	4%	5%	x	1%	90%	x	x	x	x	x	x	x	x
b. Name of each accredited person performing inspection?	8%	0%	x	2%	91%	x	x	x	x	x	x	x	x
c. Signature of each accredited person performing inspection?	13%	0%	x	4%	83%	x	x	x	x	x	x	x	x
d. Accrediting state?	9%	0%	x	3%	88%	x	x	x	x	x	x	x	x
e. AHERA accreditation number?	8%	0%	x	3%	89%	x	x	x	x	x	x	x	x
7c. Does the exclusion/inspection information contain a blueprint, diagram or written description of:													
a. Locations of homogeneous areas?	2%	x	x	x	14%	x	27%	x	58%	x	x	x	x
b. Approx. square or linear footage of homogeneous areas?	5%	x	x	x	15%	x	28%	x	52%	x	x	x	x
c. Exact sample locations (if sampling required)?	5%	x	x	x	1%	x	7%	x	85%	x	x	x	2%
d. Dates of sample collection (if sampling required)?	7%	2	x	< 1%	90%	x	x	x	x	x	x	x	0%

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Percent of Management Plans awarded specified points in Form M1 (Continued)

Question	Points^2												
	0	.2	.5	.8	1	2	3	4	5	6	10	14	NA^3
8c. Does the exclusion/inspection information identify whether homogeneous areas are TSI, surfacing materials, or miscellaneous material?	16%	x	x	x	18%	x	22%	x	45%	x	x	x	x
10c. Is the method used to determine sample locations described?	76%	x	x	x	2%	x	1%	x	18%	x	x	x	2%
11c. Is the manner used to determine sampling locations completely or substantially in accordance with AHERA for:													
a. TSI?	12%	x	x	x	x	67%	x	x	x	x	x	x	21%
b. Surfacing material?	24%	x	x	x	x	42%	x	x	x	x	x	x	34%
c. Miscellaneous materials?	9%	x	x	x	87%	x	x	x	x	x	x	x	4%
12c. Is the following information present for inspectors who collected bulk samples:													
a. Name of inspector?	12%	x	x	x	85%	x	x	x	x	x	x	x	3%
b. Signature of inspector?	20%	x	x	x	77%	x	x	x	x	x	x	x	3%
c. Accrediting state?	15%	x	x	x	82%	x	x	x	x	x	x	x	3%
d. AHERA accreditation number?	14%	x	x	x	82%	x	x	x	x	x	x	x	3%
13c. Is the following information regarding bulk sample analysis present:													
a. Copies of analyses?	1%	x	x	x	0%	x	1%	x	95%	x	x	x	2%
b. Dates of analyses?	31%	1%	x	4%	61%	x	x	x	x	x	x	x	2%
c. Name(s) and address(es) of laboratory(ies)?	2%	0%	x	2%	93%	x	x	x	x	x	x	x	2%
d. Statement(s) of laboratory accreditation?	16%	x	0%	x	2%	78%	x	x	x	x	x	x	4%
14c. Are the name and signature present for persons who performed the analyses of the bulk samples?	18%	x	1%	x	5%	72%	x	x	x	x	x	x	4%

Percent of Management Plans awarded specified points in Form M1 (Continued)

Question	Points[2]												
	0	.2	.5	.8	1	2	3	4	5	8	10	14	NA[3]
16c. Are written assessments present for friable ACBM, friable assumed ACBM, nonfriable material which is newly friable and/or TSI?	2%	x	x	x	2%	x	4%	x	79%	x	x	x	13%
17c. Do the written assessments in Q16 provide:													
a. Signature of the assessor?	17%	x	x	x	68%	x	x	x	x	x	x	x	15%
b. Date of signature?	34%	x	x	x	51%	x	x	x	x	x	x	x	15%
c. Accrediting state?	12%	x	x	x	73%	x	x	x	x	x	x	x	15%
d. AHERA accreditation number?	12%	x	x	x	73%	x	x	x	x	x	x	x	15%
18c. Are reasons given for each assessment?	4%	x	x	x	0%	x	<1%	x	81%	x	x	x	15%
Response Action Recommendation													
19c. Are there written recommendations to the LEA regarding response actions for friable homogeneous areas and TSI?	3%	x	x	x	x	0%	x	x	x	4%	81%	x	13%
20c. For the management planner who made the recommendations in Q19, is there													
a. Name?	6%	x	x	x	78%	x	x	x	x	x	x	x	15%
b. Signature?	9%	x	x	x	75%	x	x	x	x	x	x	x	15%
c. Date?	26%	x	x	x	59%	x	x	x	x	x	x	x	15%
d. Accrediting state?	9%	x	x	x	76%	x	x	x	x	x	x	x	15%
e. AHERA accreditation number?	7%	x	x	x	78%	x	x	x	x	x	x	x	15%
21c. For the response actions recommended, are there													
a. Methods described to be used for preventive measures and response actions?	1%	x	x	x	<1%	x	1%	x	82%	x	x	x	15%
b. Locations specified where such actions and measures will be taken?	2%	x	x	x	2%	x	1%	x	79%	x	x	x	15%
c. Schedules for beginning and completing each preventive measure and response action?	13%	x	x	x	3%	x	15%	x	54%	x	x	x	15%

Percent of Management Plans awarded specified points in Form M1 (Continued)

Question	Points[2]												
	0	.2	.5	.8	1	2	3	4	5	8	10	14	NA[3]
Activity Plans													
23c. Are activity plans or statements present for													
a. Reinspections?	7%	x	x	x	x	x	x	x	81%	x	x	x	13%
b. Periodic surveillance?	8%	x	x	x	x	x	x	x	79%	x	x	x	13%
c. O&M plan?	5%	x	x	x	x	x	x	x	x	x	82%	x	13%
d. Management planner recommendation for initial and additional cleaning?	30%	x	x	x	x	x	x	x	58%	x	x	x	13%
e. The LEA response to initial cleaning recommendation?	74%	x	x	x	x	x	14%	x	x	x	x	x	13%
24c. Are activity plans or statements present for													
a. Reinspections?	3%	x	x	x	x	x	x	x	x	x	x	10%	87%
b. Periodic Surveillance?	3%	x	x	x	x	x	x	x	x	x	x	10%	87%
25c. Are steps described by which workers and building occupants, or legal guardians, will be or have been notified about													
a. Inspections/reinspections?	12%	x	x	x	x	88%	x	x	x	x	x	x	x
b. Response actions	28%	x	x	x	x	72%	x	x	x	x	x	x	x
c. Post-response action activities, including periodic surveillance and reinspections?	31%	x	x	x	x	69%	x	x	x	x	x	x	x
d. Availability of management plan?	13%	x	x	x	x	x	x	x	x	x	x	x	x
Resource Evaluation													
26c. Is an evaluation of resources needed to complete the response actions and carry out reinspections, O&M, periodic surveillance and training present?	6%	0%	0%	0%	x	x	x	x	94%	x	x	x	x
27c. Does the resource evaluation take all activities listed in Q23/Q24 and all recommended actions into account?	1%	0%	0%	0%	16%	x	25%	x	51%	x	x	x	6%

Percent of Management Plans awarded specified points in Form M1 (Continued)

Question	Points[2] 0	.2	.5	.8	1	2	3	4	5	8	10	14	NA[3]
ADP													
28c. Are the following items provided regarding the LEA's designated person?													
a. Name	3%	x	x	x	x	97%	x	x	x	x	x	x	x
b. Address	14%	x	x	x	86%	x	x	x	x	x	x	x	x
c. Phone Number	10%	x	x	x	90%	x	x	x	x	x	x	x	x
d. Training received	21%	x	x	x	79%	x	x	x	x	x	x	x	x
e. Sign-off that LEA responsibilities under AHERA have or will be met	28%	x	x	x	72%	x	x	x	x	x	x	x	x
													N = 83,840

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[1] Questions used to produce logical skip sequences were numbered in Form M1, but not scored. For this reason, the question numbers presented in this and other tables are not contiguous.

[2] X means that this was not a score option for particular question.

[3] Not applicable answers are those where the question was not answered based on friability, assumption of ACM, exclusions, or other Management Plan characteristics.

APPENDIX E

EPA KEY ELEMENTS CHECKLIST

AUG 1 1988

AHERA MANAGEMENT PLAN REVIEW CHECKLIST

The following missing or deficient items have been noted in your management plan. Please revise the plan and resubmit it to the Department of the Environment within 30 days. **All items are marked with either an "M" (missing) or a "D" (deficient).**

I. General Inventory - 763.93 (e)(1)

____ A list with the name and address of each school building and whether the building contains friable ACBM, nonfriable ACBM, or ACBM assumed to be ACM.

Comments:

II. Exclusions for inspections completed before December 14, 1987 - 763.93 (e)(2) - 763.99 (If NO EXCLUSIONS declared for inspections before December 14, 1987, check box and skip to III.)

☐

(Mark N/A at B, D, E, or F, if that type of exclusion not declared.)

____ A. Date(s) of inspection(s). (Required for all exclusions except (F), which is the exclusion for school buildings constructed after October 12, 1988.)

B. Statement(s) by accredited inspector(s) that, based on sampling records:

(Check the appropriate box for exclusions being declared.)

____ ☐ Friable ACBM was identified in homogeneous or sampling area(s).

____ ☐ Nonfriable ACBM was identified in homogeneous or sampling area(s).

____ ☐ Material determined not to be ACBM in homogeneous and sampling area(s) was sampled in substantial compliance with Sec. 763.85(a).

Each statement by an accredited inspector must include:

____ i. Signature of the accredited inspector.

____ ii. Date of signature.

____ iii. Accreditation Agency (state or EPA approved).

____ iv. Accreditation Number (if applicable).

For each of the above exclusions (friable ACBM, nonfriable ACBM, and material not ACBM), the additional information specified in (C) is required.

____ C. A blueprint, diagram, or written description of each school building that identifies clearly:

____ i. Each location and approximate square or linear footage of any homogeneous or sampling area where material was sampled for ACM.

____ ii. Exact locations, if possible, where bulk samples were collected and the dates of collection.

For each bulk sample analyzed, the following three categories of information are required:

____ iii. Copies of analysis.

____ iv. Dates of analysis.

____ v. Other laboratory reports (if any prepared).

____ D. Statement(s) by accredited inspector(s) that, based on records of the inspection(s), suspected ACBM in homogeneous or sampling area(s) is assumed to be ACM.

Each statement by an accredited inspector must include:

____ i. Signature of the accredited inspector.

____ ii. Date of signature.

____ iii. Accreditation Agency (state or EPA approved).

____ iv. Accreditation Number (if applicable).

____ E. Statement(s) by accredited inspector(s) that, based on inspection records and contractor and clearance records, no ACBM is present in homogeneous or sampling area(s) where asbestos removal operations were conducted before December 14, 1987.

Each statement by an accredited inspector must include:

____ i. Signature of the accredited inspector.

____ ii. Date of signature.

____ iii. Accreditation Agency (state or EPA approved).

____ iv. Accreditation Number (if applicable).

____ F. A signed statement by an architect or project engineer responsible for the construction of a new school building built after October 12, 1988, or an accredited inspector, that no ACBM was specified as a building material in any construction document for the building, or, to the best of his or her knowledge, no ACBM was used as a building material in the building.

____ G. A copy of written assessments required to be made under Sec. 763.88 of material that was identified before December 14, 1987, as (a) friable ACBM, (b) friable suspected ACBM assumed to be ACM, (c) nonfriable material that is newly friable, or (d) thermal system insulation.

The written assessment must include the following information:

____ i. Name of assessor.

____ ii. Signature of assessor.

____ iii. Date.

____ iv. Accreditation Agency (State or EPA approved).

____ v. Accreditation Number (if applicable).

____ H. Descriptions of any response actions or preventive measures taken.

The following additional information regarding response actions and preventive measures is required "if possible".

____ i. Names and addresses of the contractors involved.

____ ii. Start and completion dates of the work.

____ iii. Results of any air samples analyzed during and upon completion of work.

Comments:

III. For inspections completed on or after December 14, 1987 - 763.93 (e)(3) - 763.85

____ A. A copy of the inspection report(s) completed under Sec. 763.85, which includes the following information:

____ i. Date(s) of inspection.

____ ii. Name of each accredited person performing the inspection.

____ iii. Signature of each accredited person performing the inspection.

____ iv. Accreditation Agency (State or EPA approved).

____ v. Accreditation Number (if applicable).

____ B. A blueprint, diagram, or written description that identifies clearly:

____ i. Each location and approximate square or linear footage where material was sampled for ACM.

____ ii. The exact location where each bulk sample was collected.

____ iii. Date of collection.

____ iv. Homogeneous areas where suspected ACBM is assumed to be ACM.

____ C. List of homogeneous areas identified in (B) above that indicates whether those areas are surfacing material, thermal system insulation, or miscellaneous material (Sec. 763.85).

D. Bulk sample procedure.

____ i. Description of the manner used to determine sampling locations.

Information regarding the inspector(s) who collected the bulk samples.

____ ii. ame.

____ iii. Signature.

____ iv. Accreditation Agency (State or EPA approved).

____ v. Accreditation Number (if applicable).

E. Analyses of bulk samples.

____ i. Copies of analyses.

____ ii. Dates of analyses.

____ iii. Name and address of laboratories that analyzed bulk samples.

____ iv. Statement(s) of laboratory accreditation.

Information regarding all person(s) who performed the analyses of bulk samples.

____ v. Name.

____ vi. Signature.

____ F. A copy of written assessments under Sec. 763.88 of all friable ACBM, friable suspected ACBM assumed to be ACM, and thermal system insulation, which includes the following information:

____ i. Name of assessor.

____ ii. Signature of assessor.

____ iii. Date.

____ iv. Accreditation Agency (State or EPA approved).

____ v. Accreditation Number (if applicable).

Comments:

IV. Designated Person - 763.93 (e)(4)

____ A. Name, address and phone number of LEA's designated person.

____ B. Training received by designated person, including date training received, length of training (hours), and course name.

Comments:

V. Response Action Recommendations- 763.93 (e)(5) - 763.88 (d)

____ A. Written recommendation made to the LEA regarding response actions, which includes the following information:

____ i. Name of management planner making the recommendation.

____ ii. Signature of the management planner.

____ iii. Date.

____ iv. Accreditation Agency (State or EPA approved).

____ v. Accreditation Number (if applicable).

Comments:

VI. Response Actions - 763.93 (e)(6)

____ A. Detailed descriptions of preventive measures and response actions to be taken.

____ i. Methods to be used for preventive measures and response actions.

____ ii. Locations where such actions and measures will be taken.

____ iii. Reasons for selecting each response action or preventive measure.

____ iv. Schedules for beginning and completing each preventive measure and response action.

Comments:

VII. Assurance of Accreditation - 763.93 (e)(7)

____ Statement that person(s) who inspected for ACBM and who will design or carry out response action, except O&M, are or will be accredited by:

i. The state's approved accreditation program,
or
ii. An EPA-approved course or another state's approved accreditation program.

Comments:

VIII. ACBM Remaining After Response Action - 763.93 (e)(8)

____ A detailed description in the form of a blueprint, diagram, or written description of ACBM, or assumed ACM, that does or will remain after response action.

Comments:

IX. Activity Plans - 763.93 (e)(9)

____ A. Plan for reinspection.

____ B. Plan for periodic surveillance.

____ C. Operations and maintenance plan.

____ i. Management planner recommendation regarding additional cleaning.

____ ii. The LEA response to that recommendation.

Comments:

X. Notifications - 763.93 (e)(10) and g(4)

A. Method to notify workers and building occupants, or legal guardians, about the following activities:

____ i. Inspections/reinspections.

____ ii. Response actions.

____ iii. Post-response action activities, including:

____ o Periodic surveillance.

____ o Reinspection activities.

B. Notification of parent, teacher, and employee organizations/groups of the availability of the management plan:

____ i. Description of steps taken.

____ ii. Dated copy of the notification.

Comments:

XI. Resource Evaluation - 763.93 (e)(11)

____ An evaluation of resources needed to complete response actions successfully and carry out reinspection, operations and maintenance activities, periodic surveillance, and training.

Comments:

XII. Names and Signatures of Responsible Parties

A. Management Plan Consultants - 763.93 (e)(12) and (f)

____ i. Name and statement of accreditation (state-approved program or EPA-approved course) for each consultant who contributed to the management plan.

____ ii. Name and signed statement by management planner that management plan complies with AHERA requirements (Optional).

B. Designated Person Sign-Off - 763.93 (i)

____ Signed certification by designated person that general LEA responsibilities under 763.84 have been met or will be met.

Comments:

XIII. Recordkeeping - 763.93 (h) and 763.94 (b-h)

A. For each preventive measure and response action already taken since December 14, 1987, the following information is required.

____ i. A detailed written description of the action.

____ 1) Methods used.

____ 2) Location of measure or action.

____ 3) Reasons for selection of each measure or action.

____ 4) Start and completion dates.

____ 5) Names and addresses of all contractors involved.

____ 6) Accreditation agency (if applicable).
(State or EPA approved)

____ 7) Accreditation number (if applicable).

____ 8) Storage or disposal site if ACM was removed.

ii. Documentation of air sampling at completion of response actions.

____ 1) The name and signature of any person collecting any air sample.

____ 2) The locations where those samples were collected.

____ 3) Date of collection.

____ 4) Name and address of analyzing laboratory.

____ 5) Date of analysis.

____ 6) Results of analysis.

____ 7) Method of analysis.

____ 8) Name and signature of person performing analysis.

____ 9) Laboratory accreditation statement.

B. Employee training already conducted since December 14, 1987 (16 hours of training required before employee disturbs ACBM) Sec. 763.92 (a)(1 and 2).

Information for each employee trained.

____ i. Name.

____ ii. Job title.

____ iii. Date training was completed.

____ iv. Location of training.

____ v. Number of hours completed.

C. If the initial cleaning required under Sec. 763.91 (c) already has been conducted, the following information is required.

____ i. Name of each person performing the cleaning.

____ ii. Date of cleaning.

____ iii. Locations cleaned.

____ iv. Methods used.

D. For operations and maintenance activities conducted under 763.91(d) since December 14, 1987, the following information is required.

____ i. Name of person(s) performing the activity.

____ ii. Start and completion dates.

____ iii. Location.

____ iv. Description of activity.

____ v. If removal, the name and location of storage and disposal sites.

E. For each time that a major asbestos activity is performed under Sec. 763.91 (e) since December 14, 1987, the following information is required.

____ i. Name and signature of person(s) performing activities.

____ ii. State of accreditation (or EPA).

____ iii. Accreditation number (if applicable).

____ iv. Start and completion dates of activities.

____ v. Location of activities.

____ vi. Description of activities.

____ vii. If ACBM removed, name and location of storage or disposal sites.

F. For each fiber release episode (763.91[f])that has occurred since December 14, 1987, the following information is required.

____ i. Date and location of episode.

____ ii. Method of repair, preventive measures or response action.

____ iii Name of person performing the work.

____ iv. If removal, the name and location of storage and disposal sites.

Additional Comments:

LEA Designated Person

Name: ____________________

Title: ____________________

Address: ____________________

____

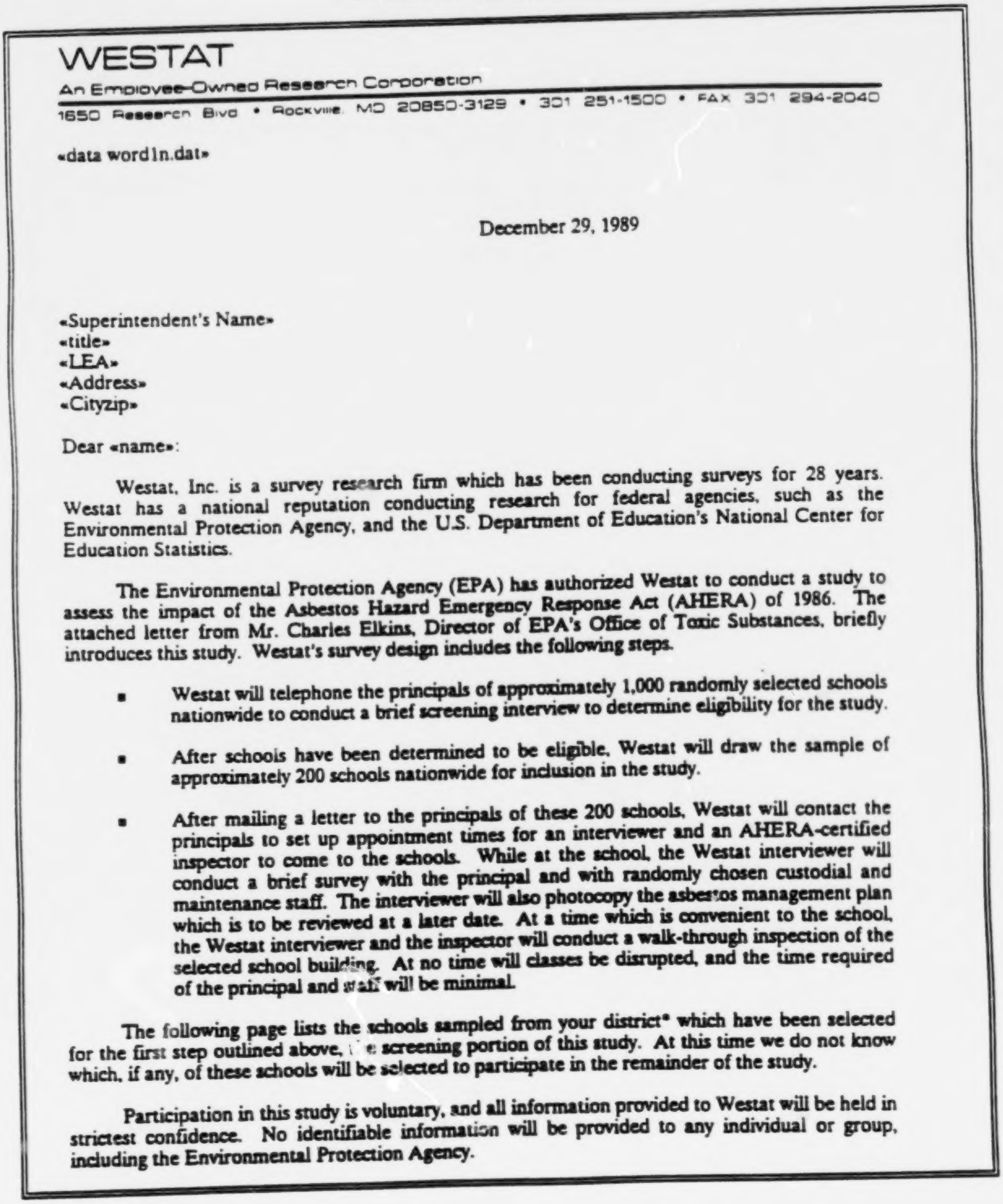
Phone Number: ____________________

Signature: ____________________ Date: __________

APPENDIX F

LOCAL EDUCATION AGENCY AND SCHOOL CONTACT LETTERS

Initial LEA Contact Letter



WESTAT
An Employee-Owned Research Corporation
1650 Research Blvd • Rockville, MD 20850-3129 • 301 251-1500 • FAX 301 294-2040

«data word1n.dat»

December 29, 1989

«Superintendent's Name»
«title»
«LEA»
«Address»
«Cityzip»

Dear «name»:

Westat, Inc. is a survey research firm which has been conducting surveys for 28 years. Westat has a national reputation conducting research for federal agencies, such as the Environmental Protection Agency, and the U.S. Department of Education's National Center for Education Statistics.

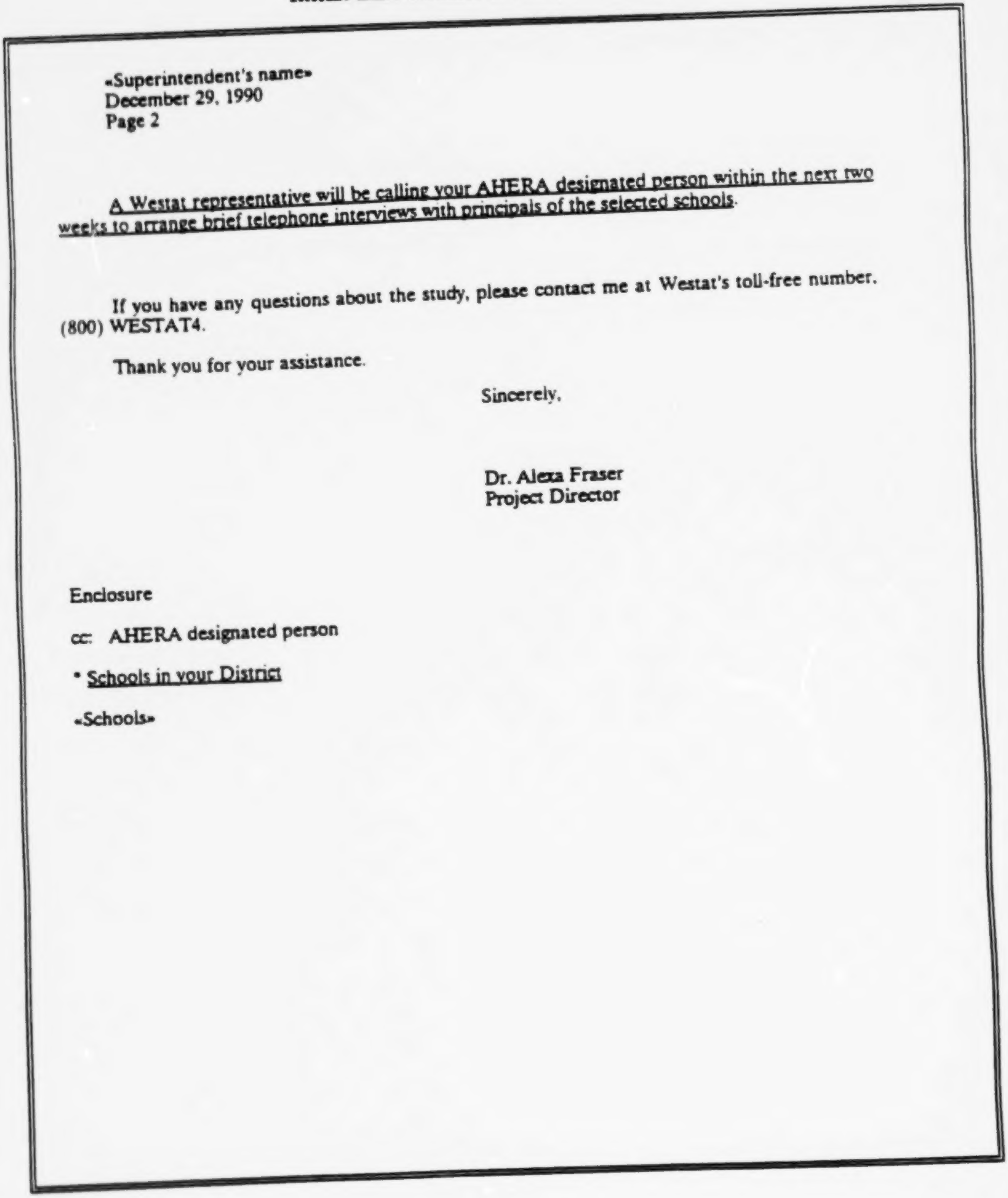
The Environmental Protection Agency (EPA) has authorized Westat to conduct a study to assess the impact of the Asbestos Hazard Emergency Response Act (AHERA) of 1986. The attached letter from Mr. Charles Elkins, Director of EPA's Office of Toxic Substances, briefly introduces this study. Westat's survey design includes the following steps.

- Westat will telephone the principals of approximately 1,000 randomly selected schools nationwide to conduct a brief screening interview to determine eligibility for the study.
- After schools have been determined to be eligible, Westat will draw the sample of approximately 200 schools nationwide for inclusion in the study.
- After mailing a letter to the principals of these 200 schools, Westat will contact the principals to set up appointment times for an interviewer and an AHERA-certified inspector to come to the schools. While at the school, the Westat interviewer will conduct a brief survey with the principal and with randomly chosen custodial and maintenance staff. The interviewer will also photocopy the asbestos management plan which is to be reviewed at a later date. At a time which is convenient to the school, the Westat interviewer and the inspector will conduct a walk-through inspection of the selected school building. At no time will classes be disrupted, and the time required of the principal and staff will be minimal.

The following page lists the schools sampled from your district* which have been selected for the first step outlined above, the screening portion of this study. At this time we do not know which, if any, of these schools will be selected to participate in the remainder of the study.

Participation in this study is voluntary, and all information provided to Westat will be held in strictest confidence. No identifiable information will be provided to any individual or group, including the Environmental Protection Agency.

Initial LEA Contact Letter (Continued)



«Superintendent's name»
December 29, 1990
Page 2

A Westat representative will be calling your AHERA designated person within the next two weeks to arrange brief telephone interviews with principals of the selected schools.

If you have any questions about the study, please contact me at Westat's toll-free number, (800) WESTAT4.

Thank you for your assistance.

Sincerely,

Dr. Alexa Fraser
Project Director

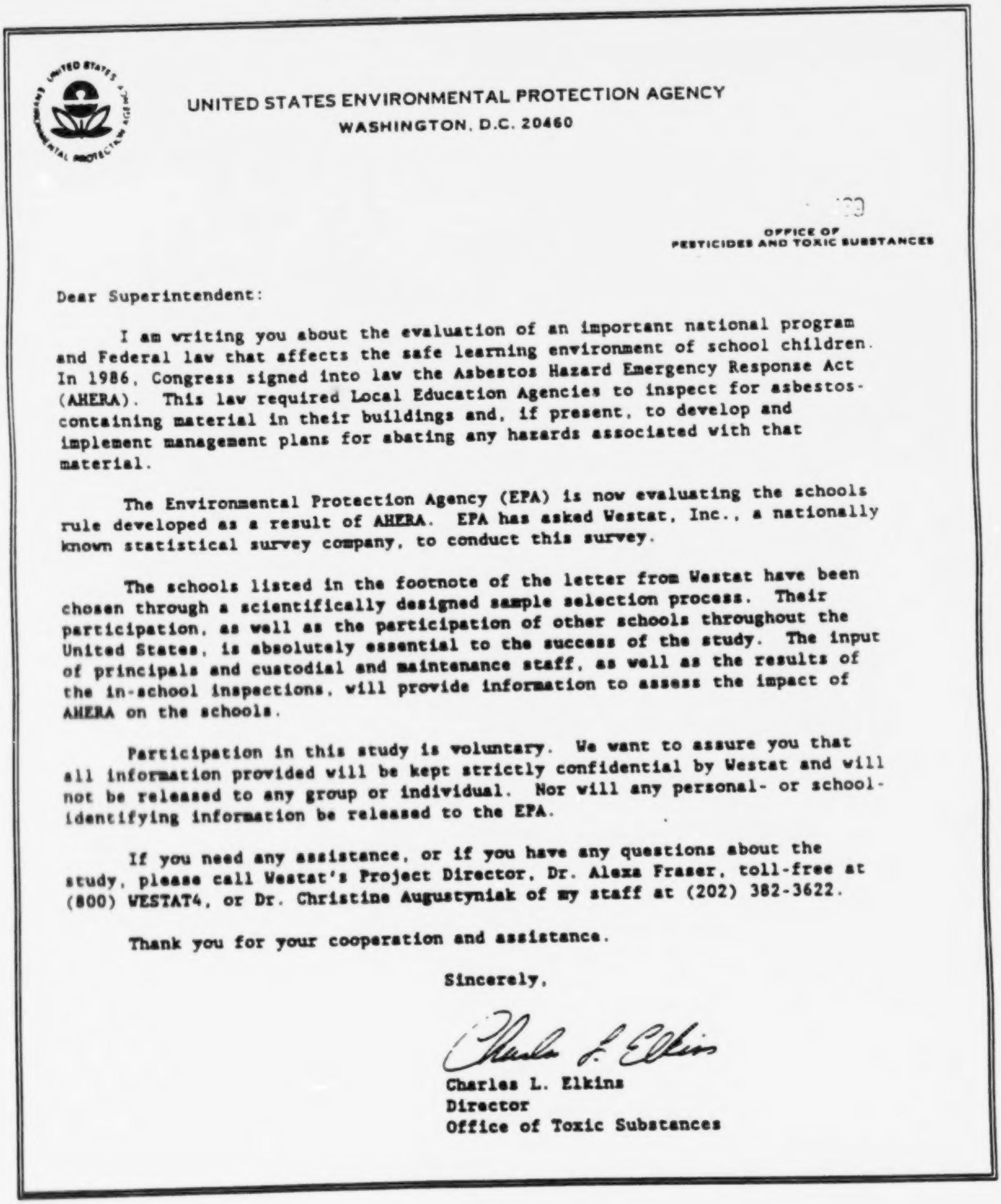
Enclosure

cc: AHERA designated person

- Schools in your District

«Schools»

Initial LEA Contact Letter (Continued)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

[illegible]

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Dear Superintendent:

I am writing you about the evaluation of an important national program and Federal law that affects the safe learning environment of school children. In 1986, Congress signed into law the Asbestos Hazard Emergency Response Act (AHERA). This law required Local Education Agencies to inspect for asbestos-containing material in their buildings and, if present, to develop and implement management plans for abating any hazards associated with that material.

The Environmental Protection Agency (EPA) is now evaluating the schools rule developed as a result of AHERA. EPA has asked Westat, Inc., a nationally known statistical survey company, to conduct this survey.

The schools listed in the footnote of the letter from Westat have been chosen through a scientifically designed sample selection process. Their participation, as well as the participation of other schools throughout the United States, is absolutely essential to the success of the study. The input of principals and custodial and maintenance staff, as well as the results of the in-school inspections, will provide information to assess the impact of AHERA on the schools.

Participation in this study is voluntary. We want to assure you that all information provided will be kept strictly confidential by Westat and will not be released to any group or individual. Nor will any personal- or school-identifying information be released to the EPA.

If you need any assistance, or if you have any questions about the study, please call Westat's Project Director, Dr. Alexa Fraser, toll-free at (800) WESTAT4, or Dr. Christine Augustyniak of my staff at (202) 382-3622.

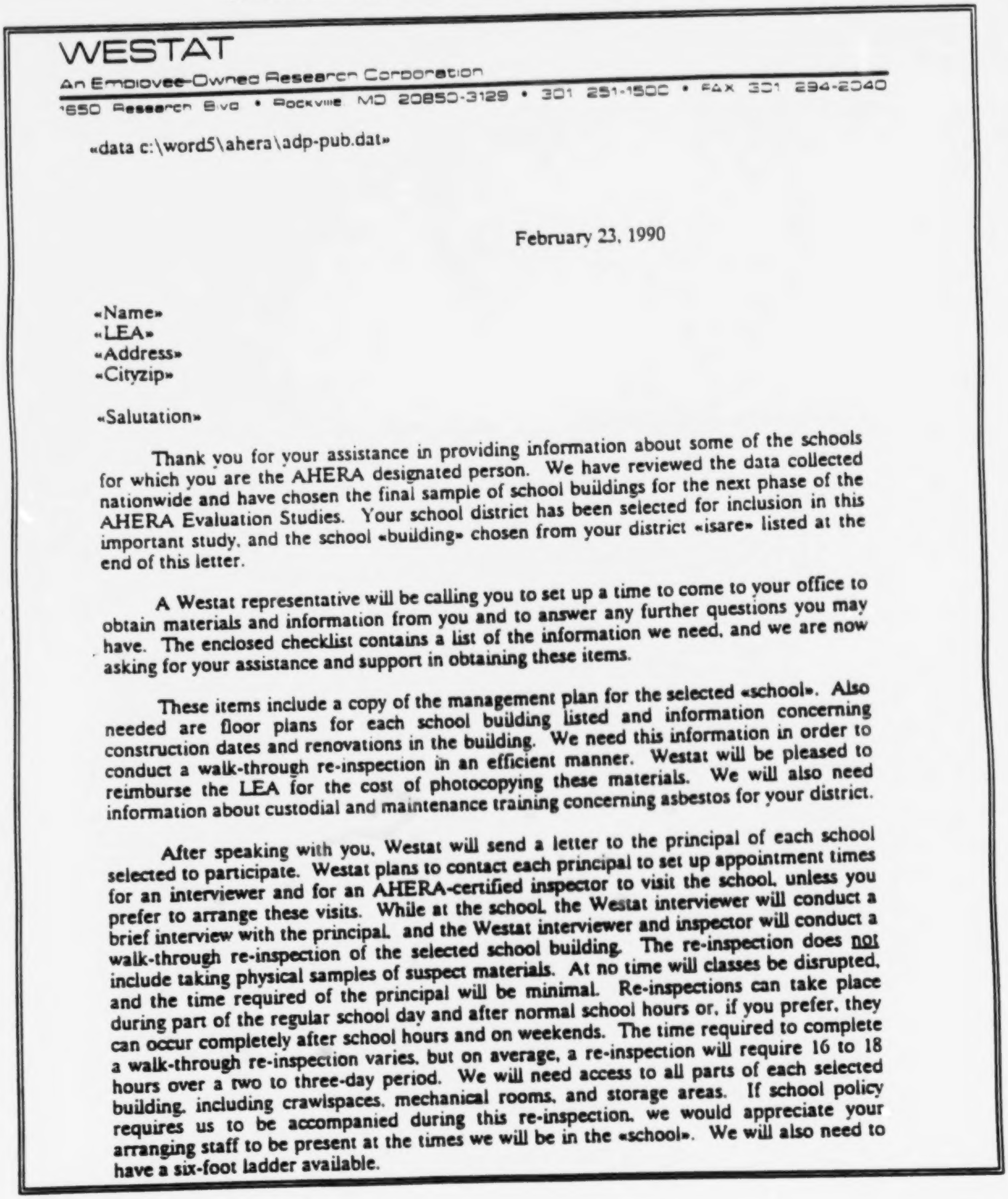
Thank you for your cooperation and assistance.

Sincerely,

Charles L. Elkins

Charles L. Elkins
Director
Office of Toxic Substances

School Selection Letter to AHERA Designated Person



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1650 Research Blvd • Rockville MD 20850-3129 • 301 251-1500 • FAX 301 294-2040

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February 23, 1990

«Name»
«LEA»
«Address»
«Cityzip»

«Salutation»

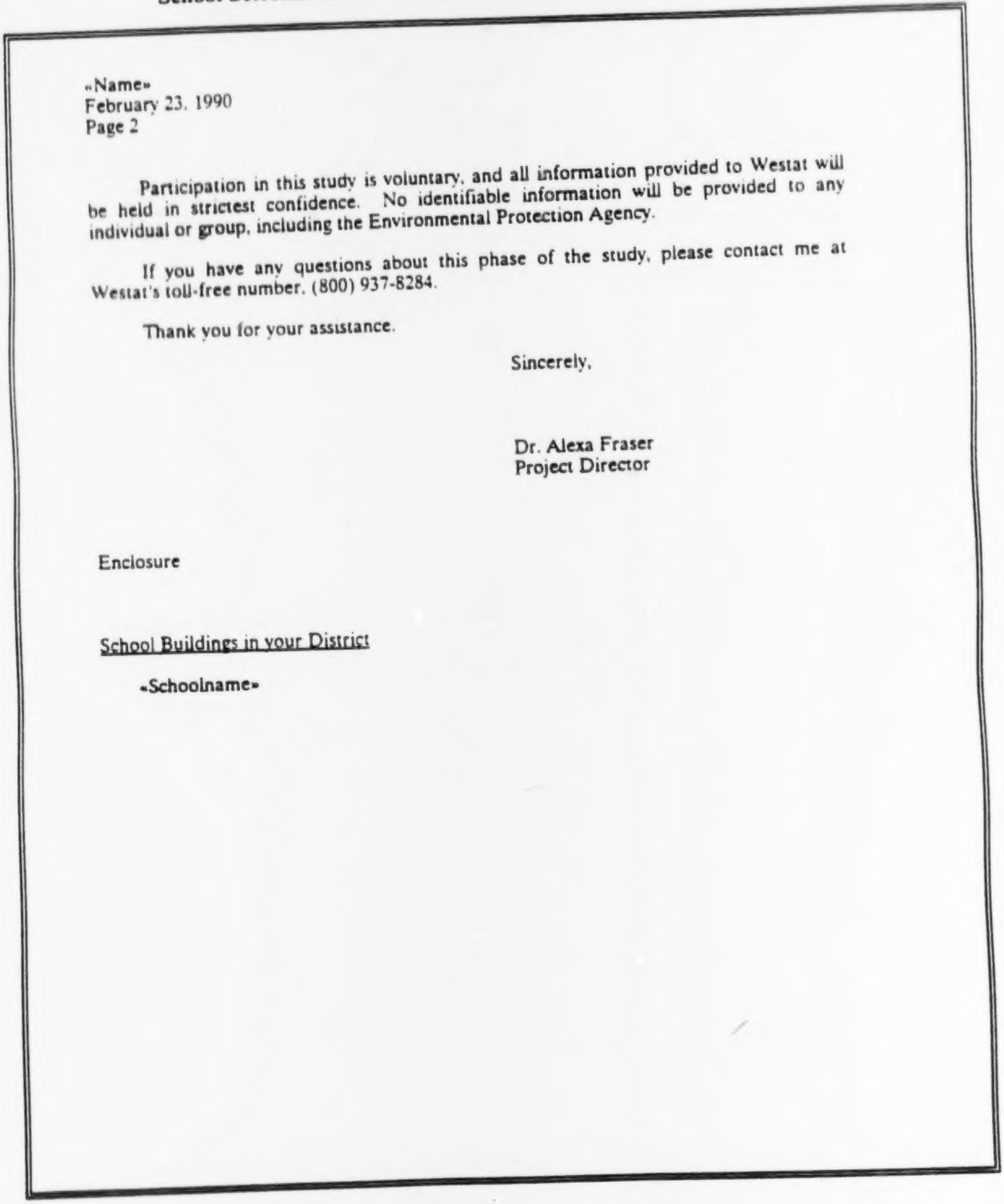
Thank you for your assistance in providing information about some of the schools for which you are the AHERA designated person. We have reviewed the data collected nationwide and have chosen the final sample of school buildings for the next phase of the AHERA Evaluation Studies. Your school district has been selected for inclusion in this important study, and the school «building» chosen from your district «isare» listed at the end of this letter.

A Westat representative will be calling you to set up a time to come to your office to obtain materials and information from you and to answer any further questions you may have. The enclosed checklist contains a list of the information we need, and we are now asking for your assistance and support in obtaining these items.

These items include a copy of the management plan for the selected «school». Also needed are floor plans for each school building listed and information concerning construction dates and renovations in the building. We need this information in order to conduct a walk-through re-inspection in an efficient manner. Westat will be pleased to reimburse the LEA for the cost of photocopying these materials. We will also need information about custodial and maintenance training concerning asbestos for your district.

After speaking with you, Westat will send a letter to the principal of each school selected to participate. Westat plans to contact each principal to set up appointment times for an interviewer and for an AHERA-certified inspector to visit the school, unless you prefer to arrange these visits. While at the school, the Westat interviewer will conduct a brief interview with the principal, and the Westat interviewer and inspector will conduct a walk-through re-inspection of the selected school building. The re-inspection does not include taking physical samples of suspect materials. At no time will classes be disrupted, and the time required of the principal will be minimal. Re-inspections can take place during part of the regular school day and after normal school hours or, if you prefer, they can occur completely after school hours and on weekends. The time required to complete a walk-through re-inspection varies, but on average, a re-inspection will require 16 to 18 hours over a two to three-day period. We will need access to all parts of each selected building, including crawlspaces, mechanical rooms, and storage areas. If school policy requires us to be accompanied during this re-inspection, we would appreciate your arranging staff to be present at the times we will be in the «school». We will also need to have a six-foot ladder available.

School Selection Letter to AHERA Designated Person (Continued)



«Name»
February 23, 1990
Page 2

Participation in this study is voluntary, and all information provided to Westat will be held in strictest confidence. No identifiable information will be provided to any individual or group, including the Environmental Protection Agency.

If you have any questions about this phase of the study, please contact me at Westat's toll-free number, (800) 937-8284.

Thank you for your assistance.

Sincerely,

Dr. Alexa Fraser
Project Director

Enclosure

School Buildings in your District

«Schoolname»

CHECKLIST FOR AHERA EVALUATION MATERIALS

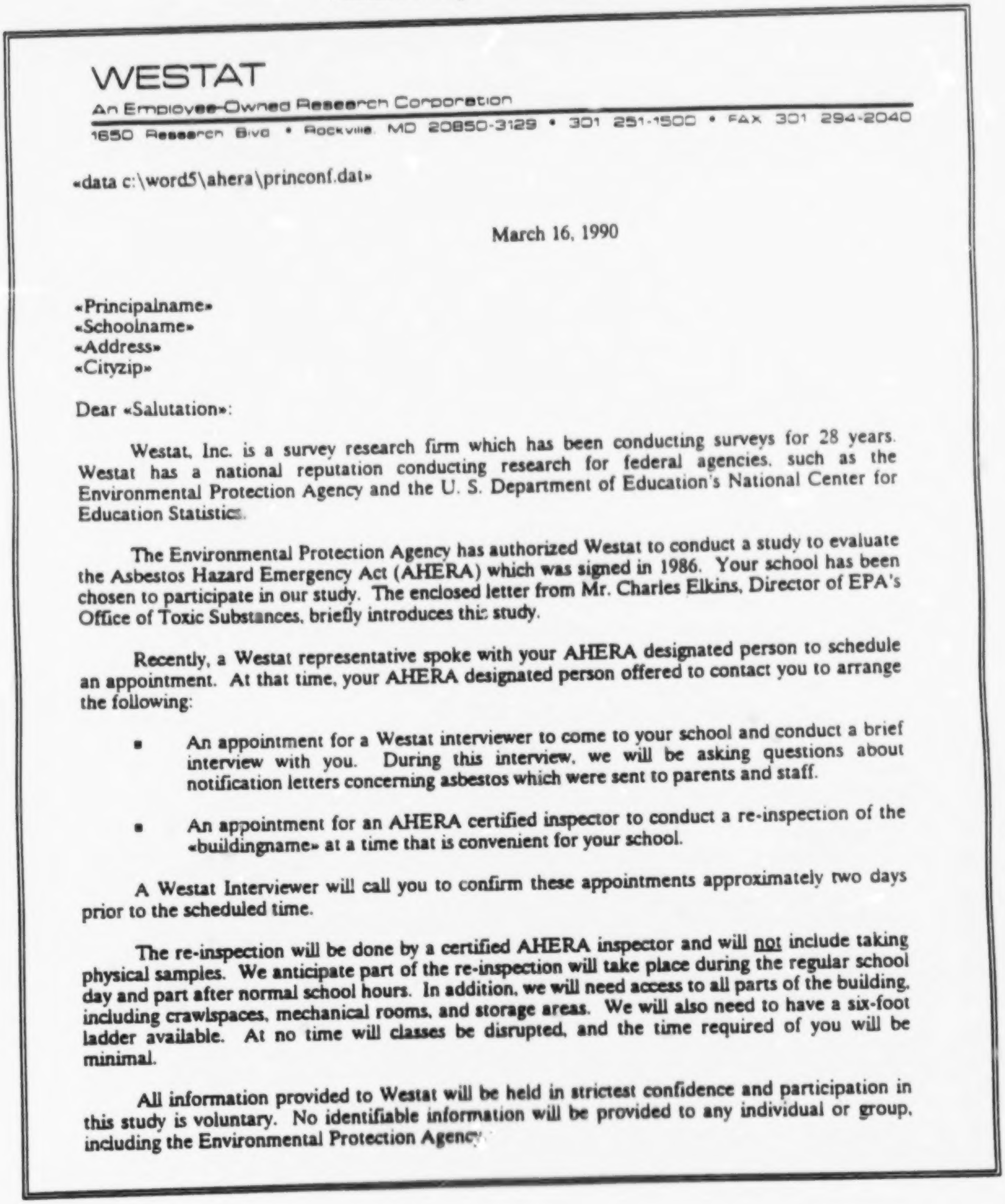
- **Management Plan** - a complete copy for each selected school. Please check to see that the copy has at a minimum the following:
  - School inspection results
  - Remediation recommendations and response actions
  - Operations and Maintenance plan
  - Copies of the notification document(s) through which parents were informed of the management plan
  - Copies of AHERA clearance air monitoring results for response actions completed, including identification of areas cleared

- **Floor plan** for each selected school building. A copy of the current fire escape plan would meet our needs.

- **Construction, renovations, and response action information** for each selected building. These information items include:
  - Construction dates of the buildings, building wings, and any additions
  - Major renovations, such as removing walls, changing the heights of ceilings or other renovations taking over one week to complete
  - The type of HVAC system
  - The location of crawlspaces, attics, mechanical rooms, and other similar areas
  - Information about asbestos response actions that have been completed in each selected school building.

- **Custodial and maintenance training** concerning asbestos.

Initial Principal Contact Letter



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«data c:\word5\ahera\princonf.dat»

March 16, 1990

«Principalname»
«Schoolname»
«Address»
«Cityzip»

Dear «Salutation»:

Westat, Inc. is a survey research firm which has been conducting surveys for 28 years. Westat has a national reputation conducting research for federal agencies, such as the Environmental Protection Agency and the U. S. Department of Education's National Center for Education Statistics.

The Environmental Protection Agency has authorized Westat to conduct a study to evaluate the Asbestos Hazard Emergency Act (AHERA) which was signed in 1986. Your school has been chosen to participate in our study. The enclosed letter from Mr. Charles Elkins, Director of EPA's Office of Toxic Substances, briefly introduces this study.

Recently, a Westat representative spoke with your AHERA designated person to schedule an appointment. At that time, your AHERA designated person offered to contact you to arrange the following:

- An appointment for a Westat interviewer to come to your school and conduct a brief interview with you. During this interview, we will be asking questions about notification letters concerning asbestos which were sent to parents and staff.

- An appointment for an AHERA certified inspector to conduct a re-inspection of the «buildingname» at a time that is convenient for your school.

A Westat Interviewer will call you to confirm these appointments approximately two days prior to the scheduled time.

The re-inspection will be done by a certified AHERA inspector and will not include taking physical samples. We anticipate part of the re-inspection will take place during the regular school day and part after normal school hours. In addition, we will need access to all parts of the building, including crawlspaces, mechanical rooms, and storage areas. We will also need to have a six-foot ladder available. At no time will classes be disrupted, and the time required of you will be minimal.

All information provided to Westat will be held in strictest confidence and participation in this study is voluntary. No identifiable information will be provided to any individual or group, including the Environmental Protection Agency.

Initial Principal Contact Letter (Continued)

«Principalname»
Page 2

Once the study results have been compiled, we will send a copy of the inspector's report to your AHERA designated person.

If you have any questions about the study, please contact Westat at our toll-free number, (800) 937-8284.

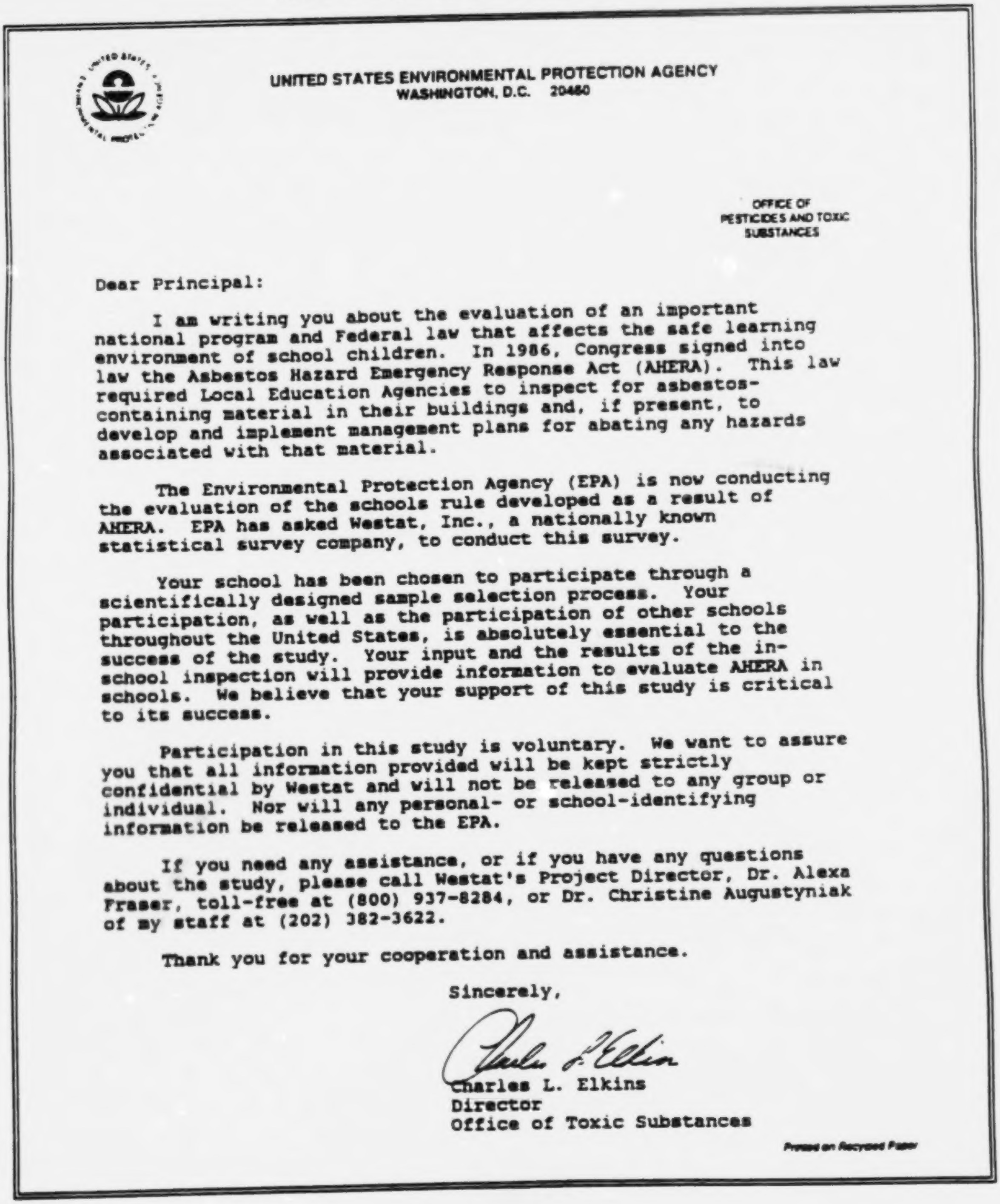
Thank you for your assistance.

Sincerely,

Dr. Alexa Fraser

Enclosure

Initial Principal Contact Letter (Continued)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

Dear Principal:

I am writing you about the evaluation of an important national program and Federal law that affects the safe learning environment of school children. In 1986, Congress signed into law the Asbestos Hazard Emergency Response Act (AHERA). This law required Local Education Agencies to inspect for asbestos-containing material in their buildings and, if present, to develop and implement management plans for abating any hazards associated with that material.

The Environmental Protection Agency (EPA) is now conducting the evaluation of the schools rule developed as a result of AHERA. EPA has asked Westat, Inc., a nationally known statistical survey company, to conduct this survey.

Your school has been chosen to participate through a scientifically designed sample selection process. Your participation, as well as the participation of other schools throughout the United States, is absolutely essential to the success of the study. Your input and the results of the in-school inspection will provide information to evaluate AHERA in schools. We believe that your support of this study is critical to its success.

Participation in this study is voluntary. We want to assure you that all information provided will be kept strictly confidential by Westat and will not be released to any group or individual. Nor will any personal- or school-identifying information be released to the EPA.

If you need any assistance, or if you have any questions about the study, please call Westat's Project Director, Dr. Alexa Fraser, toll-free at (800) 937-8284, or Dr. Christine Augustyniak of my staff at (202) 382-3622.

Thank you for your cooperation and assistance.

Sincerely,

Charles L. Elkins
Director
Office of Toxic Substances

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APPENDIX G

STATISTICAL TECHNICAL APPENDIX

G.1 SAMPLING METHODOLOGY DETAILS

G.1.1 Selection of PSUs

The PSU sample for AHERA was a subsample of a Westat master sample of 60 PSUs. The frame for Westat's master sample consisted of a list of 1,179 PSUs across the United States, excluding Alaska, Hawaii, Puerto Rico, and the island possessions. The PSUs were formed based on 1970 Census definitions and stratified by Census region and urbanicity. Then the original 60 PSUs in the master sample were selected systematically with probabilities proportionate to a measure of size that reflected the 1980 population of the PSU.

The subsample of 30 PSUs was selected as follows. First, using 1980 population as the measure of size, the six largest PSUs were taken as certainties. The two New York PSUs in the 60-PSU sample were combined to form one of these certainties. The remaining 53 PSUs were stratified based on the probability of selection in Westat's master sample. The number of PSUs selected in each stratum was proportional to the 1980 population of the stratum. The methods of selection differed in each stratum in an attempt to achieve a sample of PSUs whose overall probabilities of selection were proportionate to 1980 population. The 53 PSUs were sorted by stratum, Census region within stratum, and urbanicity within region. In the first stratum, consisting of certainty PSUs in the 60-PSU sample, five PSUs were chosen systematically and with probabilities proportionate to 1980 population. In the second stratum, consisting of noncertainty PSUs in the 60-PSU sample, 19 PSUs were chosen systematically and with equal probability. Table G-1 shows the distribution of the 30 PSUs selected for the AHERA study by Census region and urbanicity class.

G.1.2 Selection of Schools within PSUs

The sample of schools for AHERA was selected using a double-sampling design. A screening sample of 1,041 schools was initially selected to obtain information about the eligibility of the schools. Then a stratified subsample of 200 schools was selected from the eligible schools as determined by screening. The remaining eligible schools were designated as replacements.

Table G-1. The PSUs selected for AHERA by Census region and urbanicity class

Region	Urbanicity class			Total
	Urban	Suburban	Rural	
Midwest	3	3	2	8
Northeast	4	2	1	7
South	2	5	3	10
West	2	2	1	5
Total	11	12	7	30

The frame for the screening sample consisted of the 21,080 public, private, and Catholic schools on the 1988 QED file (Quality Education Data, Inc., Denver, Colorado) that were in the 30 selected PSUs. Previous evaluations of the QED file indicate that coverage of the public and Catholic schools is virtually complete; however, about 15-20 percent of non-Catholic private schools are not included in QED, representing about two percent of all schools in the nation. No attempt was made to obtain a listing of these schools for inclusion in this study. Since nationwide estimates are desired rather than separate estimates by type of school, and the missing schools account for only 2 percent of schools nationwide, any bias resulting from this omission is thought to be minimal. A sampling measure of size was assigned to each school to facilitate sample selection. These measures of size represented the conditional probabilities of including the school in the sample, given that its PSU was in the sample, and were inversely proportional to the selection probability of the PSU. The sampling measures of size were designed to yield a self-weighting sample of schools and an average of 35 schools per PSU.

After the sampling measures of size were assigned to each school, the frame was first sorted by PSU, and type of control (public and other, private, and Catholic) within PSU. Within the Catholic and private type-of-control classes, the frame was further sorted by size class (three levels based on enrollment) and instructional level (elementary and other) within size class. Within the public and other type-of-control class, the frame was further sorted by district, size class within district, and instructional level within size class. Then a screening sample of 1,041 schools was selected systematically, and with probability proportionate to the sampling measure of size, using a random start and a skip interval of 1. Table G-2 summarizes the distribution of the 1,041 schools selected for screening, by Census region and type of control.

Table G-2. The schools selected for screening by Census region and type of control

Region	Type of control			Total
	Public	Private	Catholic	
Midwest	207	36	39	282
Northeast	144	35	25	204
South	301	11	68	380
West	126	13	36	175
Total	778	95	168	1,041

The frame for the primary sample of 200 schools consisted of the 750 schools that were eligible after screening. Schools were eligible if all of the following conditions held:

a) The school contained any of grades 1-12.

b) The school had a Management Plan.

c) The school had at least one building which was built before October 1988, housed students on a regular basis, and was found to contain suspect material in an inspection performed after December 1987.

As in the selection of the initial screening sample, a sampling measure of size was assigned to each school to facilitate selection of the final sample. These measures of size were designed to yield 200 schools, 100 that had begun remediation and 100 that had not. A school was said to have begun remediation if **all** eligible buildings in the school had begun remediation. Otherwise, the school was said not to have begun remediation. Thus a building selected for inclusion in the study might be in a school defined as a non-remediation school but, in fact, remediation might have occurred. The number of schools selected in each PSU varied in order to make the workloads in each PSU more comparable. The measures of size used for sample selection purposes depended on the PSU and remediation status of the school.

After the sampling measures of size were assigned to each school, the frame was sorted by PSU, remediation status within PSU, district within remediation status, and school size (square-footage category) within district. Then a primary sample of 200 schools was selected systematically and with probabilities proportionate to the sampling measure of size using a random start and a skip interval of 1.

Because the study plan called for the inspection of 200 schools, backup and replacement samples of schools were also designated to be used in the event that primary schools refused to participate in the study. Two hundred backup schools were selected in a manner similar to the primary sample, and each backup school was paired with a school in the primary sample. The paired schools were in the same PSU, had the same remediation status, and would result in the same number of sampled buildings in virtually all cases. The remaining 350 schools that were not chosen for the primary or backup samples were designated as possible replacements. The order in which the replacements were released was prioritized so that to the extent possible, a replacement would have characteristics (i.e., PSU, remediation status, and number of buildings selected) similar to that of the primary school it replaced. Table G-3 summarizes the distribution of the 200 schools selected for the primary sample by Census region and remediation status.

Table G-3. The schools in the primary sample by Census region and remediation status

Region	Remediation status		Total
	Remediation begun	Remediation not begun	
Midwest	21	33	54
Northeast	18	30	48
South	42	26	68
West	19	11	30
Total	100	100	200

G.1.3 Selection of Buildings within Schools

Within the selected schools, buildings were sampled systematically and with probability proportionate to building size (square-footage category). In most cases, only one building was sampled per school; in a few cases, two buildings were sampled per school. While this method did not yield a self-weighting sample of buildings, it increased the precision of the building-level estimates by allowing the selection of multiple buildings in some schools, while maximizing the number of schools selected to increase the precision of school-level estimates.

Buildings were selected for schools in the primary and backup samples as follows. The frame consisted of the eligible buildings in the schools in the primary and backup samples. The 10 largest schools in the primary sample and their pairs in the backup sample were designated as schools in which two buildings would be sampled, if possible. The remaining schools were designated as schools in which one building would be sampled. Sampling measures of size that were proportional to building size and reflected the number of buildings to be selected in each school were attached to each building. Buildings in schools in which all buildings were to be sampled were taken as certainties, so the sampling measure of size was 1. For schools in which two buildings were sampled, buildings whose probability of selection would have been greater than 0.5 under probability proportional to size (PPS) sampling were also taken as certainties.

After the sampling measures of size were assigned to each building, the frame was sorted by building size within each school. The buildings were selected systematically with probability proportionate to the sampling measures of size, using a random start and a skip interval of 1. This method yielded 210 buildings in the primary sample and 207 buildings in the backup sample. Three of the schools in the backup sample in which two buildings were to have been selected only had one building.

Buildings were selected in a similar manner for schools in the replacement sample, except that the number of buildings to select in each school was decided as follows. Seven PSU/remediation status categories had primary schools in which two buildings were selected. In these PSU/remediation status categories, two buildings were selected from replacement schools with at least two buildings, and one building was selected from each of the remaining schools. In the remaining PSU/remediation status categories, one building was selected from each school. These procedures ensured that schools and their replacements were in the same PSU/remediation status category, and would result in the same number of selected buildings if possible. Table G-4 shows the distribution of the 210 buildings in the primary sample, by Census region and remediation status.

Table G-4. Buildings in the primary sample by Census region and remediation status

Region	Remediation status		Total
	Remediation begun	Remediation not begun	
Midwest	21	33	54
Northeast	18	30	48
South	47	26	73
West	23	12	35
Total	109	101	210

The screening information was originally collected by telephone. The accuracy of this information was verified during the AHERA designated person interview in the field. In some cases, changes to the sampling frame used to select buildings were recorded. For example, an eligible building not previously reported was discovered, or a structure previously recorded as one building was really two separate buildings according to the definitions used in this study. In these cases, buildings were resampled in the field based on the updated screening information. Sixty-two buildings were resampled in this manner.

G.2 DETAILS OF DATA WEIGHTING

G.2.1 Calculating School Weights

For the AHERA evaluation, the weight used for school-level estimation is given by:

$$W_{sch} = W_1 \times W_2 \times f_1 \times W_3 \times f_2 \times f_3$$

where W_1 = the inverse of the PSU probability of selection.

W_2 = the inverse of the within PSU sampling rate for the screening sample.

f_1 = a screening sample nonresponse adjustment factor calculated within each stratum, equal to the number of schools selected for screening divided by the number of schools that responded during screening. Schools that were found to be ineligible for AHERA during screening are considered to be responding schools for weighting purposes.

W_3 = the inverse of the conditional within stratum sampling rate for selecting the final sample from the schools eligible after screening.

f_2 = a final sample nonresponse adjustment factor calculated within each stratum, equal to the number of schools selected for the final sample divided by the number of participating schools. The participating schools include substitutes in the backup and replacement samples.

f_3 = a nonreponse adjustment factor for the "samples" of original inspections, parents and teachers in RA4, RA5-parents and RA5-teachers. The factor was calculated within each Census region/remediation status category and given by:

$$f_3 = \frac{\sum\limits_{\text{final sample}} W_1 \; W_2 \; f_1 \; W_3 \; f_2}{\sum\limits_{\text{approp. RA sample}} W_1 \; W_2 \; f_1 \; W_3 \; f_2}$$

where the numerator is summed for the 198 schools in the final sample and the denominator is summed for the participating schools in the original inspection, parent, or teacher samples.

Due to the patterns of nonresponse, there are four different sets of school weights, one for RA2, RA5-principals, and RA6 and one for each of Research Areas 4, 5-parents, and 5-teachers. The school weights range in value from 183 to 3,959.

K.2.2 Calculating Building Weights

For the AHERA evaluation, the weight used for building-level estimation is given by:

$$W_{bldg} = W_{sch} \times W_4$$

where W_{sch} = the final school weight for RA2, RA5 principals, and RA6.

W_4 = the inverse of the conditional probability of selecting a building within a school.

The building weights calculated for the AHERA evaluation were used in RA1 and RA3. These weights range in value from 183 to 10,135.

G.3 DETAILS OF IMPUTATION

A sequential hot deck procedure was used for imputation in RA2, RA5, and RA6. In this method, cases are sorted by variables thought to be related to the statistics of interest. These sort variables form imputation cells within which the imputation will occur. For each item to be imputed, the cases that have a nonmissing value for this item ("donors"), and the cases that need imputation on this item ("recipients"), are determined. Then each case is looked at in turn within each imputation cell. When a recipient is found, the donor immediately preceding the recipient (or immediately after, if none is preceding) is used for imputation. Occasionally, a donor is used more than once in this method; in some cells, there may not be any potential donors. When the latter occurs, different sort variables are chosen until all cases have been imputed. In our implementation of the hot deck procedure, no limit was set as to the number of cases that could be imputed for a given item. In general, less than 10 percent of the cases for a given item were imputed, although the percentage is higher in a few cases. The extent to which the imputation procedure affected the results for these cases was not determined, since the items involved were of minor importance when considering the results of the AHERA evaluation as a whole.

G.3.1 RA1: School Reinspection

No statistical imputation procedures were employed in the comparison of the original AHERA inspection and the reinspection. Since this research area was an evaluation of the original AHERA inspection, information missing from the Management Plan would indicate the level of quality of the inspection and would therefore not be a candidate for imputation. Further, it was felt that imputing quantities of identified or quantified material from one school building to another would be of questionable validity due to variations in school size and would compromise the inspection evaluation.

G.3.2 RA2: Management Plan Evaluation

The sequential hot deck procedure described above was used to impute items in RA2. The variables control type and Census region defined the imputation cells. All necessary values were imputed during the first invocation of the hot deck procedure.

Table G-5 shows the number of imputed cases by item. The number of total cases varies across items due to the skip pattern.

G.3.3 RA3: Response Action Evaluation

No statistical imputation procedures were employed in this research area. Information on recommended response actions was obtained from Management Plans; it was felt that imputation from one Management Plan to another would compromise the evaluation of recommended response actions. Information on actual response actions was obtained from the reinspection; it was felt that only response actions that could be confirmed and evaluated by the reinspector should enter the analysis.

G.3.4 RA4: Original Inspector Evaluation

The sequential hot deck macro procedure was not used to impute missing data items in RA4. In evaluation analysis of this type, one does not wish to ascribe to one inspector the characteristics of another. Only "Don't know" responses were imputed based upon the following item-specific rules:

- AHERA accreditation (I3YR, I3MM): If don't know year, then assume year = 1988. If don't know month, then assume month = May.
- AHERA refresher course (I5YR, I5MM): If don't know year, then assume year = 1989. If don't know month, then assume month = March.
- Date of first asbestos inspection (I12YR, I12MM): If don't know year, then year = missing. If don't know month, then assume month = June.
- Number of building/school asbestos inspections conducted (I13AA -- I17AA): All don't knows were recorded to missing. All missing values were then treated as zeroes for calculating the number of building/school inspections completed for each of the five time periods (prior to January 1988, January through June 1988, July through December 1988, January through June 1989, and July through December 1989).
- Years of building trade experience (I19YRS, I19MM): If don't know number of years, then years = missing. If don't know number of months, then months = zero.
- Years of environmental laboratory experience (I21YRS, I21MM): If the number of years was not ascertained, then years = missing.

Table G-5. Imputed cases in RA2

Item	Total cases	Imputed cases	Percent imputed	Item	Total cases	Imputed cases	Percent imputed
M1C	198	2	1.0%	M25CB	198	6	3.0%
M2C	196	4	2.0%	M25CC	198	6	3.0%
M3C	196	4	2.0%	M25CD	198	5	2.5%
M7CA	198	1	0.5%	M26C	198	1	0.5%
M7CD	198	6	3.0%	M27C	189	3	1.6%
M12CA	191	1	0.5%	M28CA	198	6	3.0%
M12CB	191	4	2.1%	M28CB	198	11	5.6%
M12CC	191	1	0.5%	M28CC	198	12	6.1%
M12CD	191	1	0.5%	M28CD	198	14	7.1%
M13CA	193	2	1.0%	M28CE	198	13	6.6%
M13CB	193	2	1.0%	M29A	198	1	0.5%
M13CC	193	4	2.1%	M30AA	39	5	12.8%
M13CD	193	3	1.6%	M30AB	39	2	5.1%
M14C	189	2	1.0%	M31UA	198	5	2.5%
M17CA	170	1	0.6%	M31UB	198	7	3.5%
M20CA	167	1	0.6%	M31UC	198	34	17.2%
M20CB	167	1	0.6%	M31UD	198	2	1.0%
M20CC	167	1	0.6%	M31UE	198	7	3.5%
M20CD	167	1	0.6%	M31UF	198	7	3.5%
M20CE	167	1	0.6%	M31UG	198	7	3.5%
M23CA	174	1	0.6%	M32U	198	1	0.5%
M23CC	174	3	1.7%	M33UA	198	2	1.0%
M23CD	174	3	1.7%	M33UB	198	1	0.5%
M23CE	174	8	4.6%	M34UA	198	2	1.0%
M24CA	24	1	4.2%	M34UB	198	2	1.0%
M24CB	24	1	4.2%	M34UC	198	3	1.5%
M25CA	198	4	2.0%	M34UD	198	5	2.5%

G3.5 RA5: Process of Notification

In this research area, principals reported on the notification of parents (RA5-principals), parents reported on their own notification (RA5-parents), and teachers reported on their own notification (RA5-teachers). When deciding how to impute, it was assumed that principals should be able to answer questions regarding the notification of parents in their school. Parents and teachers, however, may have memory recall problems or may not be the most appropriate respondents for this information. Thus for most items, principals' "Don't know" responses were imputed, and parents' and teachers' "Don't know" responses were not. In the principal part of RA5, "Don't know" responses were considered as missing and were imputed, except for item P4. For this item, which asks whether parents were notified about asbestos, "Don't know" responses were considered an interesting finding and were not imputed. Also, for the principal part of RA5, "Don't know" responses were imputed as "No's" for the items in Table G-6.

The sequential hot deck procedure described earlier was used to impute cases other than the notification cases described above. The variables chosen to define the imputation cells are listed below. The sort variables were employed one at a time until all data were imputed.

1. District
2. Type of control within PSU
3. Type of control within region
4. Control type

Tables G-6 through G-8 show the number of imputed cases by item. The asterisk indicates that "Don't know" responses were imputed as "No's" for that item. The number of total cases varies across items due to the skip pattern.

Table G-6. Imputed cases in RA5-principals

Item	Total case	Imputed cases	Percent imputed
P7A	163	10	6.1%
P7B	163	12	7.4%
P7C	163	14	8.6%
P7D	163	11	6.7%
P7E	163	17	10.4%
P7F	163	10	6.1%
P8	63	4	6.3%
P9A	163	21	12.9%
P9B	163	22	13.5%
P9C	163	20	12.3%
P9D	163	17	10.4%
P9E	163	19	11.6%
P9F	163	21	12.9%
P10A*	163	1	0.6%
P10B*	163	1	0.6%
P10C*	163	1	0.6%
P10D*	163	1	0.6%
P10E*	163	1	0.6%
P11*	163	3	1.8%
P12	33	2	6.1%
P13*	33	4	12.1%
P14	163	11	6.7%

*"Don't know" responses were imputed as "no".

Table G-7. Imputed cases in RA5-parents

Item	Total cases	Imputed cases	Percent imputed
N14A	79	1	1.3%
N14B	79	1	1.3%
N14C	79	1	1.3%
N14D	79	1	1.3%
N14E	79	1	1.3%
N14F	79	2	2.5%
N15	34	1	2.9%
N17A	78	3	3.8%
N17B	78	3	3.8%
N17C	78	3	3.8%
N17D	78	3	3.8%
N17E	78	7	8.9%
N17F	78	3	3.8%
N18A	78	3	3.8%
N18B	78	3	3.8%
N18C	78	3	3.8%
N18D	78	3	3.8%
N18E	78	4	5.1%
N19	76	5	6.5%
N20	23	5	21.7%
N21	22	6	27.2%

Table G-8. Imputed cases in RA5-teachers

Item	Total cases	Imputed cases	Percent imputed
N9	119	2	1.7%
N10	148	3	2.0%
N35A	129	3	2.3%
N35B	129	1	0.8%
N35C	129	1	0.8%
N35D	129	2	1.6%
N35E	129	1	0.8%
N35F	129	3	2.3%
N36	85	2	2.3%
N38A	123	1	0.8%
N38B	123	1	0.8%
N38C	123	1	0.8%
N38D	123	1	0.8%
N38E	123	1	0.8%
N38F	123	2	1.6%
N39A	123	1	0.8%
N39B	123	1	0.8%
N39C	123	1	0.8%
N39D	123	1	0.8%
N39E	123	1	0.8%
N40	123	3	2.4%
N41	22	1	4.5%
N42	22	1	4.5%

G.3.6 RA6: Maintenance Personnel Behavior

The sequential hot deck procedure described earlier was used to impute items in RA6. The variables chosen to define the imputation cells are listed below. The sort variables were employed one at a time until all data were imputed.

1. District
2. Type of control within PSU
3. Related item. For example, if item L8, regarding the location of the most recent training for custodians, was missing, then the imputation would be based on items L14 and L15, regarding the location of the most recent training for maintenance workers.

In this research area "Don't know" responses were considered as missing and were imputed. Table G-9 shows the number of imputed cases by item. The number of total cases varies across items due to the skip pattern.

Table G-9. Imputed cases in RA6

Item	Total cases	Imputed cases	Percent imputed
L8	188	2	1.1%
L9	188	4	2.1%
L10	188	7	3.7%
L11A	188	13	6.9%
L11B	188	11	5.9%
L11C	188	10	5.3%
L11D	188	11	5.9%
L12	188	3	1.6%
L13	188	2	1.1%
L14	173	2	1.2%
L15	173	3	1.7%
L16	173	6	5.2%
L17A	173	11	6.4%
L17B	173	10	5.8%
L17C	173	9	5.2%
L17D	173	11	6.4%
L18	173	2	1.2%
L19	173	1	0.6%
L26A	198	2	1.0%
L26B	198	5	2.5%
L26C	198	3	1.5%

G.4 DETAILS OF VARIANCE ESTIMATION

Replication methods are often used to estimate variance in complex sample surveys. These techniques use several subsamples or replicates obtained from the full sample, calculate the statistics of interest for each replicate, and estimate the variance of each statistic using the different replicates. Many different replication methods exist, and they differ in the way in which replicates are actually formed. A method called jackknife replication, one of the standard methods of variance estimation available, was used in AHERA as described below.

First, stratum and unit codes were assigned to the participating schools by PSU to facilitate the formation of replicates. These codes are shown in Table G-10. Each certainty PSU (whose probability of selection is 1) forms its own stratum. The asterisk indicates that, within these PSUs, the schools were randomly assigned a unit code of 1 or 2. Note that the remaining noncertainty PSUs were paired resulting in two noncertainty PSUs per stratum. Buildings received the same stratum and unit codes as their corresponding schools.

Table G-10. **Stratum and unit codes for AHERA**

PSU	Stratum	Unit code
A111	1	*
A113	2	*
A120	3	*
A140	7	1
A210	4	*
A220	5	*
A240	7	2
A330	8	2
A350	8	1
A410	6	*
A420	9	2
B120	10	2
B150	11	1
B210	12	1
B230	13	2
B260	13	1
B330	15	1
B350	16	2
B370	16	1
B380	17	2
B390	17	1
B420	9	1
B440	18	1
C120	10	1
C210	11	2
C230	12	2
C310	14	1
C330	14	2
C360	15	2
C420	18	2

Eighteen replicates were formed by randomly choosing a unit code (either 1 or 2) in each of the 18 strata. Replicate i consists of the schools in stratum i that do not have the unit code that was chosen, plus all of the schools in the other strata. The resulting replicates are called "jackknife" replicates since they were obtained by dropping a unit or set of units from the full sample.

An estimated total based on the survey results was calculated using the usual formula

$$\hat{Y} = \sum_{i=1}^{n} w_i \; y_i$$

where
Y = the population total of interest.
$\hat{Y}$ = the sample estimate of Y.
n = the number of participating schools or buildings.
w_i = the full sample weight for school or building i.
y_i = the observed value of Y for sampled school or building i.

Other statistics such as means and proportions were then calculated from the totals. For example, the sample estimate of the mean is

$$\hat{\bar{Y}} = \frac{\hat{Y}}{\sum_{i=1}^{n} w_i}$$

A proportion may be considered a special case of the mean in which y_i is an indicator variable equal to 0 or 1.

The weights for replicate i were equal to: *zero* for the schools that were deleted in stratum i, *two times the full sample weight* for the remaining schools in stratum i, and the *full sample weight* for the schools in the remaining strata. Instead of doubling the weight in the schools remaining in stratum i, the weights are sometimes recalculated for each replicate by applying the same weighting method that was used for the full sample weights. Although the latter method of recalculating the replicate weights is preferable, it was not used for the AHERA studies. However, we expect that variances calculated by the method used in AHERA will be reasonably close to those that would have been obtained from the preferred approach.

The variance of a statistic of interest was then calculated using the formula:

$$\mathrm{Var}(\hat{Z}) = \sum_{i=1}^{k} (\hat{Z}_i - \hat{Z})^2$$

where Z = the statistic of interest.
k = the number of replicates.
$\hat{Z}$ = the full sample estimate of Z.
$\hat{Z}_i$ = the estimate of Z for replicate i.

APPENDIX H

ASSESSMENT SCORE TABLES

Table L-1. Computer Generated Potential for Damage (PD)

From Form W3					
Potential H_2O damage 1 = Yes 2 = No	General access 1 = Yes 2 = No	Maintenance access 1 = Low 2 = High	Air velocity 1 = None 2 = Low 3 = High	Effect of vibration 1 = Low 2 = High	Generated potential for damage 1 = No PD 2 = PD 3 = Signif. PD
1	1	1 or 2	3	1 or 2	3
2	1	1 or 2	3	1 or 2	3
1	1	1 or 2	2	1 or 2	3
2	1	1 or 2	2	2	3
2	1	1 or 2	2	1	2
1	1	1 or 2	1	1 or 2	3
2	1	1 or 2	1	2	3
2	1	1 or 2	1	1	2
1	2	2	3	1 or 2	3
2	2	2	3	1 or 2	3
1	2	2	2	1 or 2	3
2	2	2	2	2	3
2	2	2	2	1	2
1	2	2	1	1 or 2	3
2	2	2	1	2	3
2	2	2	1	1	2
1	2	1	3	1 or 2	3
2	2	1	3	1 or 2	3
1	2	1	2	1 or 2	3
2	2	1	2	2	3
2	2	1	2	1	2
1	2	1	1	1 or 2	2
2	2	1	1	2	2
2	2	1	1	1	1

Table L-2. Computer-Generated AHERA 1-7 Categories and Expanded AHERA 1-7 Categories

From Form W3				Generated potential for damage from Table L-1 1 = No PD 2 = PD 3 = Signif. PD	AHERA 1-7 category	Expanded AHERA 1-7 category
Suspect material key code (T,S,M)	Friable 1 = Yes 2 = No 3 = Not req'd	Local damage 1 = <1% 2 = 1-25% 3 = >25%	Dispersed damage 1 = <1% 2 = 1-10% 3 = >10%			
S or M	3	(terminate)	- - - - - -	- - - - - - - - - -	NATD	NATD
S or M	2	1	1	1, 2, or 3	NA	NA
S or M	1	1	1	1	7	7
S or M	1	1	1	2	5	5
S or M	1	1	1	3	6	6
S	1 or 2	1	2	1, 2 or 3	2	2
S	1 or 2	2	2	1, 2 or 3	3	3
S	1 or 2	2	1	1, 2 or 3	2	2
S	1 or 2	3	1 or 2	1, 2 or 3	3	3
S	1 or 2	1, 2 or 3	3	1, 2 or 3	3	3
M	1 or 2	1	2	1, 2 or 3	4	1a
M	1 or 2	2	2	1, 2 or 3	4	4b
M	1 or 2	2	1	1, 2 or 3	4	4a
M	1 or 2	3	1 or 2	1, 2 or 3	4	4b
M	1 or 2	1, 2 or 3	3	1, 2 or 3	4	4b
T	1, 2 or 3	1	1	1	7	7
T	1, 2 or 3	1	1	2	5	5
T	1, 2 or 3	1	1	3	6	6
T	1, 2 or 3	1	2	1, 2 or 3	1	1a
T	1, 2 or 3	2	1	1, 2 or 3	1	1a
T	1, 2 or 3	2	2	1, 2 or 3	1	1b
T	1, 2 or 3	3	1 or 2	1, 2 or 3	1	1b
T	1, 2 or 3	1, 2 or 3	3	1, 2 or 3	1	1b

NATD = Not able to determine/no access to material.

NA = Not applicable/AHERA 1-7 is not determined for these materials.